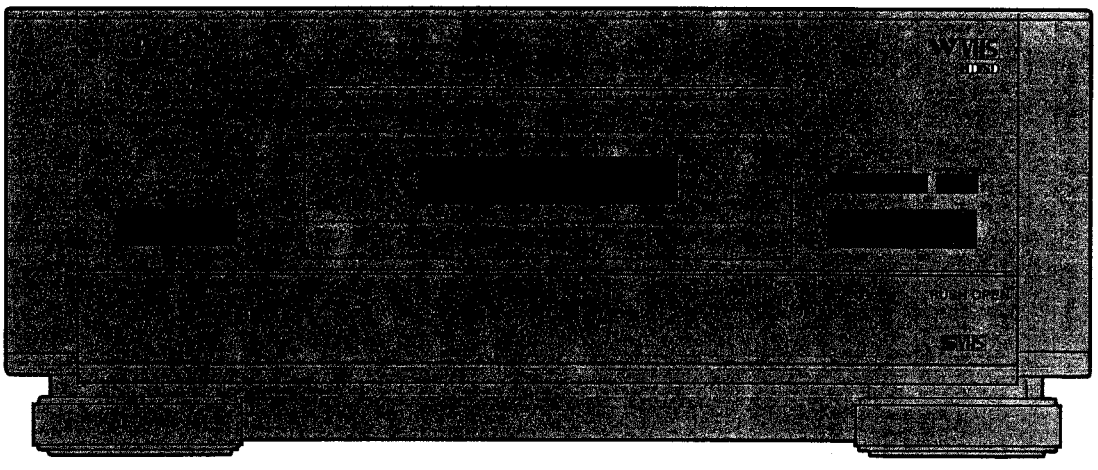
INSTRUCTIONS

JVC

SR-W320U

Hi-Vision VIDEO CASSETTE RECORDER

W VHS HD/SD S VHS Hi-Fi



For Customer Use:
Enter below the Serial No. which is located on the rear of the cabinet. Retain this inforamtion for future reference.

Model No. **SR-W320U**

Serial No.

SL96020

SAFETY PRECAUTIONS

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK.
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This video cassette recorder should be used with AC 120V~, 60 Hz only.
CAUTION:
To prevent electric shocks and fire hazards, do NOT use any other power source.

When you are not using the video recorder for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.

ATTENTION

This product complies with D.O.C Limits (C.R.C., C. 1374) pertaining to Class A digital apparatus.

ATTENTION

Ce produit est conforme aux normes du M.D.C (C.R.C., ch. 1374) s'appliquant aux appareils numériques de Classe A.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequncy energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION

CHANGES OR MODIFICATIONS NOT APPROVED BY JVC COULD VOID USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

NOTE: The rating plate and the safety caution are on the rear of the unit.

TABLE OF CONTENTS

1 **Precautions** 4
Features 4
VCR 5
Video Cassettes 5
Head Cleaning 6
Recording Modes and Types of the Cassettes ... 6
Loading and Unloading the Cassette 7

2 **Controls and Connectors** 8
Front Panel 8
Rear Panel 12

3 **Indicators and Displays** 14
What Is Shown on the Front Display Window ... 14

4 **Preparations** 16
Connections 16
Time Setting 17

5 **Recording** 18
Basic Operations 18
Retake Facility 19
Blank Search Facility 19
AI Auto Calibration 20

6 **Timer-Programmed Recording** 21
Timer-Programmed Recording 21
Check, Correct and Cancel of the Preset Programs 22

7 **Playback** 24
Basic Procedure 24
Special Playback Procedures 25
Index Search 27
Next Function 29
Adjustment of the Playback Picture 30

8 **Tape Dubbing** 32
When Playing Back on SR-W320U and Recording on Another Unit 32
When Playing Back on Another Unit and Recording on SR-W320U 33
When Playing Back on a Video Movie and Recording on SR-W320U 34

9 **RS-232C Interface** 35
RS-232C Protocol 35
Commands 36

10 **Troubleshooting** 40

11 **Appendix** 42
Technical Guide 42
Index 46

12 **Specifications** 47

1 PRECAUTIONS

FEATURES

- W-VHS format HD mode offers high-definition recording and playback of high-vision signals on a base band.
- W-VHS format SD mode also available to ensure high-quality picture for the existing TV format sources.
- W-VHS metal compatible high-power Sendust heads
- HD super solid DD mechanism enables metal tapes to run with a greater stability.
- The existing VHS/S-VHS video can be recorded and played back with a superb quality.
- Built-in RS-232C enables you to externally control this unit from your personal computer.

With this video cassette recorder, you can enjoy the HD and SD modes of W-VHS video. Be sure to use cassette tapes marked with S-VHS.
Since the VHS mode and S-VHS mode are also available, use video cassettes marked with S-VHS or S-VHS when you want to enjoy these modes.
When executing HD recording with this unit, connect to a high vision TV with a built-in MUSE decoder having HD output connectors (Y, PB, PR). When any other high-vision TV is in use, you have to connect a commercially available MUSE decoder.

What is HD mode? (HD denotes High Definition)

In HD mode,HDTV signals are recorded using multiple tracks, HDTV signal was originally developed by NHK of Japan, and it stands for High-Definition Television.HDTV is a next generation broadcasting system which eables high-definition picture quality in comparision to conventional NTSC system.

What is SD mode? (SD denotes Standard Definition)

In SD mode standerd TV signals are recorded on a single track with high picture quality and long recording times.

VCR

- Avoid using the recorder in places subject to the following conditions:
  – extreme heat, cold, or humidity,
  – dust,
  – vibrations, and
  – poor ventilation.

- Be careful of moisture condensation.
  Do not use the recorder immediately after moving it from a cold place to a warm place. The water vapor in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.

- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill on the top cover of the recorder.
  - Use in horizontal (flat) position only.

- During transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

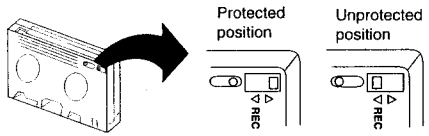
- Use video cassettes marked with W-VHS / S-VHS / VHS with this unit. C-cassettes can be used with a C-cassette adapter (SA-CP11U) connected.

- Video cassettes marked with W-VHS are exclusively for use with a video cassette recorder marked with W-VHS. Loading such cassettes into existing S-VHS or VHS cassette recorders may cause a damage to the machine.

- Any cassette is provided with a safety tab for protecting it from accidental erasure. The cassette with its safety tab set at a protective position automatically starts playback when loaded into a machine.

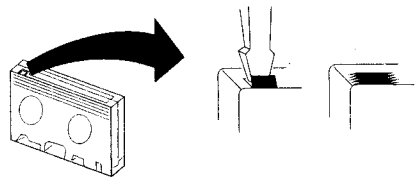
W-VHS cassettes

Slidable safety tab.



S-VHS, VHS cassettes

- To prevent accidental erasure, remove the cassette's safety tab.
- To record on a cassette whose safety tab has been removed, cover the hole with adhesive tape.



- Reverse side of a cassette is not usable.

- Before putting the cassette into storage, make sure that the tape is uniformly wound up to its beginning.

Head cleaning

Perform head cleaning even 20 hours to enjoy clear pictures.

Video heads get soiled with repeated recording and playback, resulting in rough, uneven picture.
Perform cleaning of the tape transport mechanism every 20 hours with the provided head cleaning tape dedicated to W-VHS.

How to use the cleaning tape

1. Load the W-VHS dedicated head cleaning tape.
2. Press the PLAY button and then STOP button after about 30 seconds.
3. Unload the head cleaning tape and execute a usual recording and playback procedure on a W-VHS cassette to see if audio/visual quality has been recovered.
4. If tape quality does not pick up, repeat the procedures 1. and 2. once or twice.

Cautions

- Do not rewind the cleaning tape after every use (for about 30 seconds). You have only to start at the position where the tape stopped in previous cleaning. Rewind to the beginning when the tape has been used to an end.
- 30 seconds are enough for one run of the cleaning tape. To keep running the tape for longer than 45 seconds may damage the heads.
- If sound and picture quality does not recover with the cleaning procedures repeated three times, there may be some other causes of trouble. Consult your JVC dealer.
- The W-VHS dedicated cleaning tape can be used 100 times.
- Recording or playback is not possible on the cleaning tape.
- Do not use any cleaning tape other than the W-VHS dedicated cleaning tape for this machine.
- The W-VHS dedicated cleaning tape can be used only with the video cassette recorder marked with WVHS.

RECORDING MODES AND TYPES OF THE CASSETTES

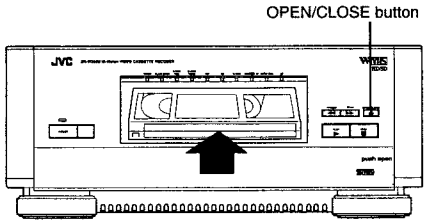
Recording modes available depend on the types of the cassette in use.

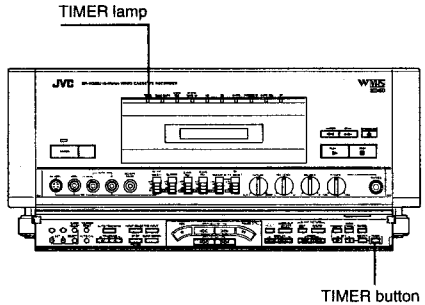
Tapes in use	Recording modes	Recording speed	Remarks
W-VHS	HD	SP	S-VHS/VHS recording not possible.
	SD	EP	
S-VHS	S-VHS	SP/EP Selectable	HD/SD recording not possible.
	VHS	SP/EP Selectable	
VHS	VHS	SP/EP Selectable	HD/SD/SVHS recording not possible.

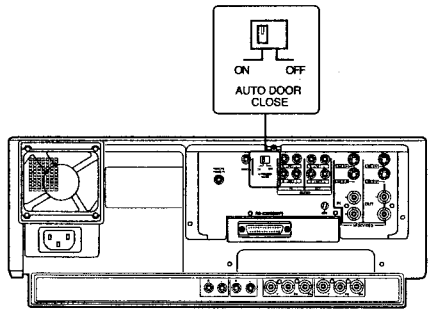
Cautions

- HD recording at EP mode is not possible.
- SD recording at SP mode is not possible.

LOADING AND UNLOADING THE CASSETTE







Loading

1. Press [OPEN/CLOSE] button to open the door.
2. Insert the cassette.
   - Slowly push the center with its visible tape side up.
   - The door automatically closes.
   - Counter display turns 0:00:00.
   - The cassette with its safety tab removed automatically starts playback.

Cautions

- Keep your hand or other foreign substances away from the loading slot. Take special care of young children to protect their hands from the door. If a hand or finger should be caught, the door opens after several seconds.
- When the cassette automatically comes out, insert it again after several seconds.

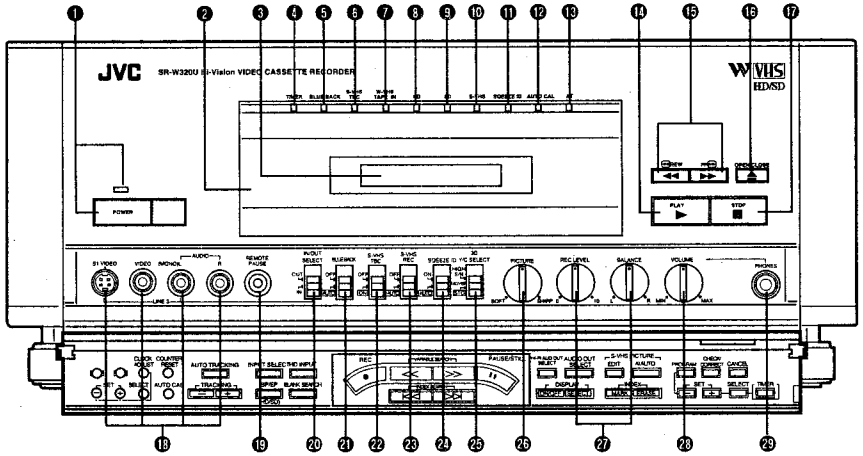
Unloading

1. Press [OPEN/CLOSE] button. The door opens and the tape comes out.
   The cassette cannot be removed while the [TIMER] lamp is lit. Press the [TIMER] button and make sure the [TIMER] lamp is out, then remove the cassette.
2. Press [OPEN/CLOSE] button. The door closes.

With the [AUTO DOOR CLOSE] switch on the rear panel is at ON, the door automatically closes when the door is kept open for about one minute with no cassette loaded. If you need not this facility, set the [AUTO DOOR CLOSE] switch to OFF.

2 CONTROLS AND CONNECTORS

Front panel



❶ [POWER] button/lamp
Press to turn the power on and off. The lamp lights when the power is on.

❷ Tape loading slot door

❸ Video unit display window
Displays the operational state of the recorder, counter and clock digits.

❹ [TIMER] lamp
Lights red when the timer preset recording stands by.

❺ [BLUE BACK] lamp
Lights green when the BLUE BACK switch is at AUTO.

❻ [S-VHS TBC] lamp
Lights green when the S-VHS TBC switch is at ON.

❼ [W-VHS TAPE IN] lamp
Lights red when the W-VHS tape is in the recorder.

❽ [HD] lamp
Lights red when HD mode is selected with a W-VHS tape in use or when a HD-recorded tape is played back.

❾ [SD] lamp
Lights green when SD mode is selected with a W-VHS tape in use or when a SD-recorded tape is played back.

❿ [S-VHS] lamp
Lights green when the S-VHS recording switch is at AUTO with an S-VHS tape in use or when an S-VHS recorded tape is played back.

⓫ [SQUEEZE ID] lamp
Lights when
- the SQUEEZE ID switch is at AUTO and S1 signal is fed to the external input signal connector.
- the tape recorded in full mode is played back, provided that the S1 video signal is recorded together.
- the SQUEEZE ID switch is set at ON.

Full Mode
Entered to fit the picture with aspect ratio of 16 : 9, such as high-vision picture, within aspect ratio of 4 : 3, resulting in a vertically expanded picture.

S1 Picture Signal
Signal for discriminating whether or not the picture is in full mode, superimposed on the S video signal. Without this signal recorded, the full mode picture does not appear as a horizontally wide picture when played back.

Front panel

⓬ [AUTO CAL] auto calibration lamp
Flickers green during auto calibration going on and lights when it is finished.(See page 20)

⓭ [AT] auto tracking lamp
Lights or flickers green during auto tracking going on.

⓮ [PLAY] button
Press to play back the cassette.

⓯ [REW]/[FF] button
Press to rewind or fast forward.

⓰ [OPEN/CLOSE] door button
Press when opening or closing the door and removing the cassette.

⓱ [STOP] button
Press to stop any operation of VCR.

⓲ LINE3 IN/OUT connectors
Receives and sends external video and audio signals.
Switchable between input and output with the IN/OUT SELECT switch ⓴.
S1 VIDEO: For input and output of S1 video signal
VIDEO: For input and output of video signal (RCA)
(MONO) L: For input and output of audio signal (left). If the sound is monaural with a single cable, plug it into this connector, and equal audio signals are recorded for left and right.
R : For input and output of audio signal (right).
S1 video signal is given priority to a standard video signal.

⓳ [REMOTE PAUSE] input connector
Connect the remote pause cable to this connector when editing with the JVC video movie. This connector is given priority to the remote pause connector at rear panel. (See page 34)

⓴ [IN/OUT SELECT] switch
Selects between input and output of the three external input/output connectors ⓲.

㉑ [BLUE BACK] switch
AUTO: Blue screen comes up when there is no input signal.
OFF: No bule screen comes up.

㉒ [S-VHS TBC] switch
Turns on and off the TBC (Time Base Corrector). This switch is disabled in HD/SD mode.
ON: Normally set to ON. Picture distortion is corrected to provide a stable picture quality during playback.
OFF: Set to OFF when playing back the tape with much noise.

㉓ [S-VHS REC] switch
Turns on and off the S-VHS recording facility.
AUTO: S-VHS recording takes place automatically with the S-VHS cassette loaded and VHS recording with the VHS cassette loaded.
OFF: VHS recording takes place regardless of the type of cassette loaded.

㉔ [SQUEEZE ID] switch
Selects the way S1 video signal is recorded.
AUTO: Input signal is recorded as it is.
ON: S1 video signal is forcedly recorded.

㉕ [3DY/C SELECT]
Select the right recording setup depending on in what condition the picture to be recorded is.
STD: Usually select this setup.
MOVE: Select this for a picture with a lot of motion.
High SN : Select this for a picture with a lot of noise.

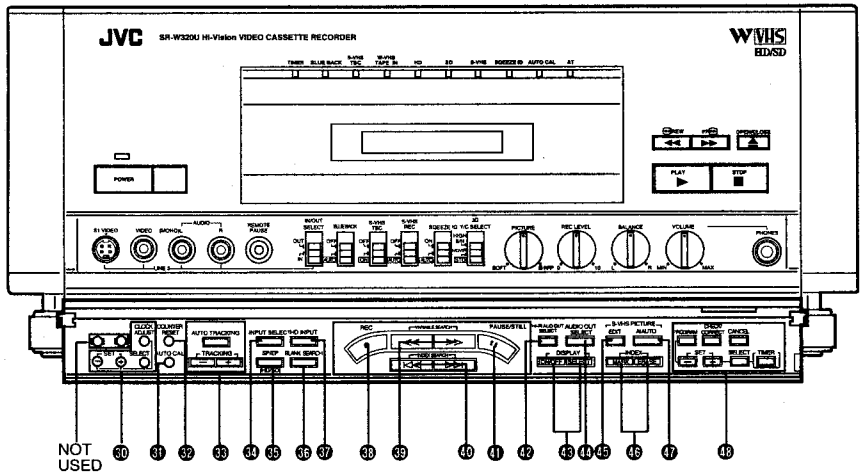
㉖ [PICTURE] adjust knob
During playback, turn this knob clockwise to obtain a SHARP picture and counterclockwise for a SOFT picture.

㉗ [REC LEVEL]/[BALANCE] adjust knob
Adjusts HiFi recording level and the balance between right and left channels. Carefully adjust this knob, as too low a recording level may lead to a greater noise and too high a level may cause a distortion.

㉘ [VOLUME] adjust knob
Adjust the sound level of headphone connected to the HEADPHONE connector.

㉙ [PHONES] connector
Accepts the mini plug type headphone.

Front panel



30 CLOCK setup buttons
Used to set up clock . (See page 17).
CLOCK
ADJUST : Starts or ends the time setting mode.
SET -/+ : Sets day and time.
SELECT : Fix the selected data.

31 [AUTO CAL] button
Automatically adjust the recording level depending on the tape characteristics. This facility is disable when a W-VHS is in use. (See page 20).

32 [COUNTER RESET] button
Resets the tape counter display to 0:00:00.

33 [TRACKING] button
-/ +: Suppresses the disturbances appearing on the picture when the tape recorded on another machine is played back (or put on slow playback).
AUTO
TRACKING: Turns on and off the auto tracking facility.

34 [INPUT SELECT] button
Selects among video signals L1, L2, L3 and HD. Every time the button is pressed, the signals shift LINE 1 (L1) → LINE 2 (L2) → LINE 3 (L3) → HD one after another.

35 [SP/EP (HD/SD)] select button
Selects between recording speeds.

36 [BLANK SEARCH] button
Searches a non-recorded (blank) section of the tape. (See page 19)

37 [HD INPUT] button
Converts the input signal to an HD input. With the INPUT SELECT switch 34 pressed, other input signals can be entered.

38 [RECORD] button
Press to start recording.

39 [VARIABLE SEARCH] button
Changes the search speed upon every pressing the button.(See page 26)

40 [INDEX SEARCH] button
Press to start index search. Searches the start of recorded or timer-recorded section or the section indicated with INDEX signal, where normal playback starts. (See page 27)

41 [PAUSE/STILL] button
Press to pause the recording or change the playback picture to a still picture. Canceled by pressing the PLAY button.

Front panel

42 [HIFI AUD OUT SELECT] button
Selects HiFi audio sources to be played back. Every pressing the button changes right and left audio → left audio → right audio one after another.

43 [DISPLAY] button
SELECT: Every pressing the button changes the display window between several sets: Tape counter/mode display → hour/mode display → audio level indication ...
ON/OFF: Turns the display on and off.

44 [AUDIO OUT SELECT] button
Selects audio to be played back.
Every pressing the button changes HiFi → Normal → Mix (HiFi and Normal) one after another.

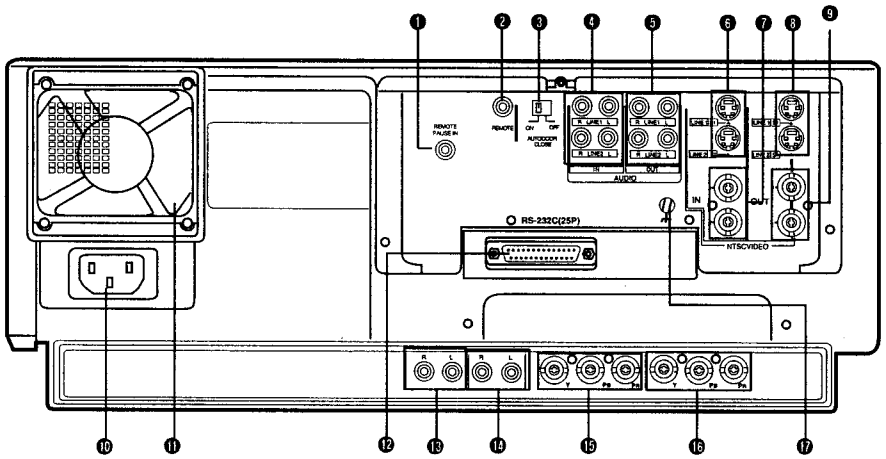
45 [EDIT] button
Press to play back or record with a picture quality suitable for dubbing or editing.

46 [INDEX] button
Record and erases the index signal.
MARK: Record VISS (INDEX)
ERASE: Erases VISS (INDEX)
(See page 27)

47 [AI AUTO] button
Adjust the picture to a desired video quality.
Every pressing the button changes AI AUTO.

48 Timer program preset button
PROGRAM :
Start programming
CHECK/CORRECT:
Check and correct the programmed data.
CANCEL: Press to cancel the programmed data. This can be used as a tape counter reset button, unless timer programing is in operation.
SET -/+: Sets the date, hour and recording speed.
SELECT: Selects the set data.
TIMER: Press to keep the timer-programmed recording at standby or cancel it. (See page 21)

Rear Panel



❶ Remote pause input connector
Connect the remote pause cable to this connector when editing with the JVC video movie. The remote pause connector on the front panel is given priority.

❷ Remote control connector
Connect the remote control cable when externally controlling the machine with optinal remote control unit (RM-G30U).

❸ Auto door close switch
ON: When the door is left open for one minute, the door automatically closes.
OFF: The door does not automatically close. Use the OPEN/CLOSE button for operation of the door.

❹ Audio input connectors 1,2
Receive the audio signal from an external audio unit. When dubbing a tape, connect the playback machine to this connector.

❺ Audio output connectors 1,2
Output the audio signal to an external audio unit. Connect such a machine as TV with audio input connectors. When dubbing a tape, connect the recording machine to this connector.

❻ S1 video input connectors 1, 2
Receive S or S1 video signals. Connect a playback machine to this connector for dubbing.

❼ Video input connectors 1,2
Receive composite video signals. Connect a playback machine to this connector for dubbing.

❽ S1 video output connectors 1,2
Output S video or S1 video output signal. Connect such a machine as TV with video input connectors. When dubbing a tape, connect the recording machine to this connector.

❾ Video output connectors 1,2
Output composite video output signals. Connect such a machine as a TV with video input connectors. When dubbing a tape, connect the recording machine to this connector.

❿ AC IN socket
Connect to 120VAC,60 Hz power outlet using the provided power cord.

⓫ Fans
Prevents abnormal temperature rise in the unit, so neither remove nor block it. They go on running until the temperature drops enough even if the power is turned off.

Rear Panel

⓬ RS-232C connector
Connect a RS-232C cable to control this unit from a personal computer. Use a cross cable.

⓭ [HD AUDIO IN]connector
Connect to the audio output connector of a MUSE decoder or the MUSE decoder audio output connector of a high vision TV.

⓮ [AUDIO OUT 4] connectors
Connect to the audio input connectors of a high vision TV.

⓯ [HD VIDEO IN] connector
Connect to the output connector of a MUSE decoder or the MUSE decoder output connector of a high vision TV.

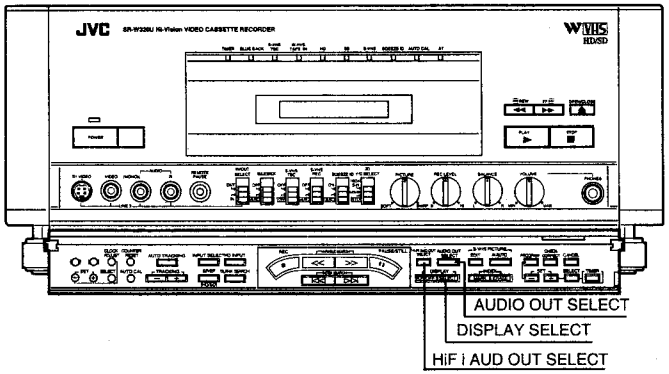
⓰ [HD VIDEO OUT] connector
Connect to the W-VHS input connector or HD input connector of a high vision TV.

⓱ Ground connector

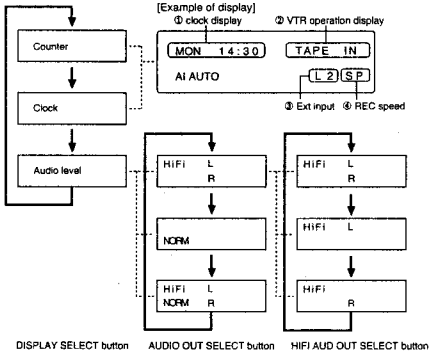
Notes
Take care of the following points when connecting to the audio input connector 2 and the HD audio input connector.
When connected to the right and left channels of the HD audio input connector and to the audio input connector 2, the audio input signal at the HD audio input connector is given priority even if the channel L2 has been selected.
To receive audio signal through the audio input connector 2, unplug the cable connected to the HD audio input connector.
When connected only to the audio input connector 2, the audio signal is received also when HD input is received.

3 INDICATORS AND DISPLAYS

What is shown on the front display window



Pressing the AUDIO OUT SELECT, HIFI AUDIO OUT SELECT and the DISPLAY buttons changes the front window display among the following sets of display data.



Example of display

1 Clock display

Shows date and time

Sun:	Sunday	Thu:	Thursday
Mon:	Monday	Fri:	Friday
Tue:	Tuesday	Sat:	Saturday
Wed:	Wednesday		

Counter display

Counter display flickers when an unrecorded section is reached during fast forward or rewind.

2 VCR operation display

TAPE IN	Cassette is loaded
EJECT	Cassette being removed
REC	Recording
PAUSE	Recording at pause
FF	Fast Forward
REW	Rewind
FWD	Fast forward playback
REV	Rewind playback
STILL	Still picture (forward)
-STILL	Still picture (reverse)
SLOW	Slow playback (forward)
-SLOW	Slow playback (reverse)
VISS2	VHS index search
BLANK	Blank search
DEW	Machine is dewed
PLAY flickering	PLAY next function memory*
EJECT flickering	EJECT next function memory*

* Next function memories include timer standby and power "off" as well, but they are not indicated on the front display window.

3 External input

Displays the external input connectors selected

L1	LINE (S1 video) input connector 1
L2	LINE (S1 video) input connector 2
L3	LINE (S1 video) input connector 3
HD	HD input connector

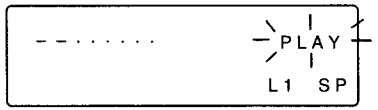
4 Recording mode

SP	Standard (in HD mode)
EP	Extended (in SD mode)

Other display data

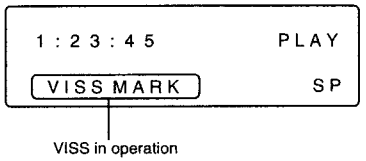
Next function super rewind

[Example of display]



VISS operation display

[Example of display]



VISS MARK flickering	Index signal being recorded
VISS ERASE flickering	Index signal being erased

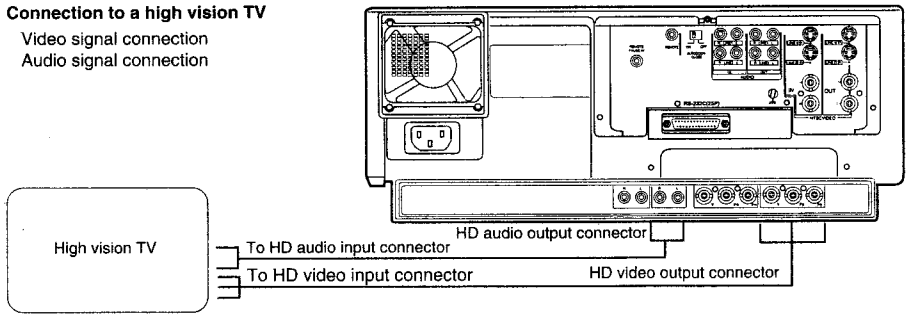
Connections

The SR-W320U can be connected to the following units.

Rear panel

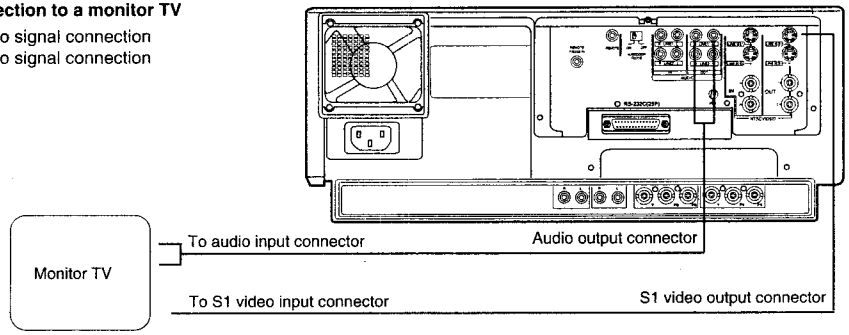
Connection to a high vision TV

Video signal connection
Audio signal connection

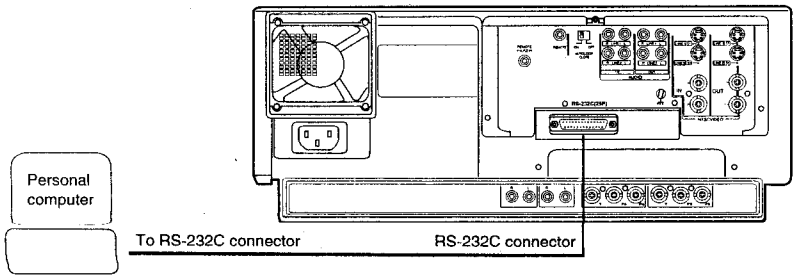

High vision TV
To HD audio input connector
To HD video input connector
HD audio output connector
HD video output connector

Connection to a monitor TV

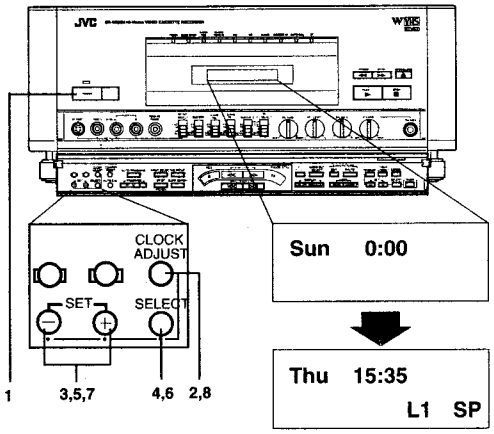
Video signal connection
Audio signal connection



Connection to a personal computer through RS-232C



Time Setting



(Example)
When setting to Thursday 35 minutes past 3 o'clock pm.

1 Turn the power on.

2 Press CLOCK ADJUST button.
Date display flickers.

3 Set the date with + or – button.

4 Press SELECT button.
Hour display flickers.

5 Set the hour with + or – button.

6 Press SELECT button.
Minute display flickers

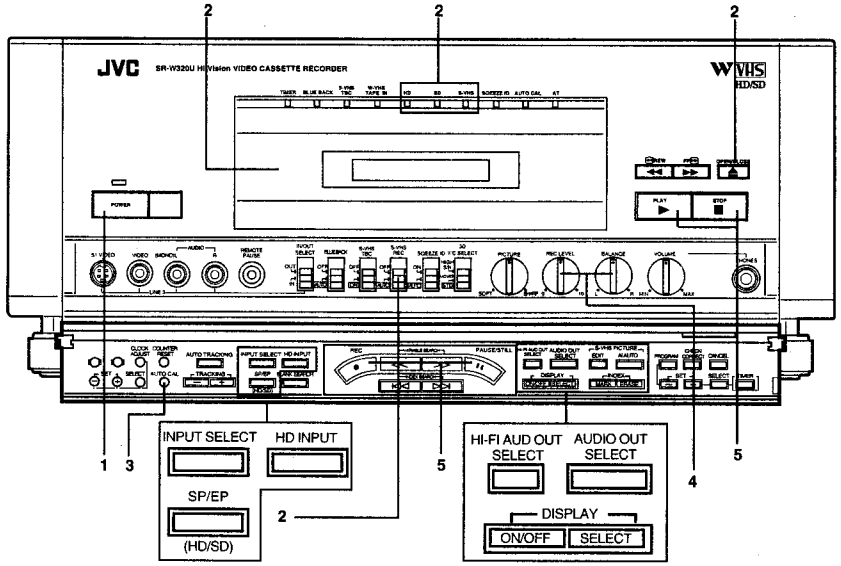
7 Set the minute with + or – button.

8 Press CLOCK ADJUST button.
The clock starts with Thursday 3:35 pm, simultaneously as the button is pressed.

If there is no time set, 0:00 flickers on the front panel window display. This occurs also when power breakdown stays longer than 30 minutes.

5 RECORDING

Basic Operations



Preparations

1 Turn the power on.

2 Select the recording mode.

Which mode is available depends on the type of the cassette in use.

Cassette in use	Recording mode
W-VHS	HD mode SD mode
S-VHS	S-VHS mode VHS mode
VHS	VHS mode

HD mode

a. Press the HD INPUT button.
b. Load the W-VHS tape. Then, HD lamp lights and SP is shown on the front window display.

SD mode

a. Select L1, L2 or L3 with INPUT SELECT button.
b. Load the W-VHS tape. Then, SD lamp lights and EP is shown on the front window display.

S-VHS mode

a. Select L1, L2 or L3 with INPUT SELECT button.
b. Load the S-VHS tape.
c. Select recording speed with the SP/EP (HD/SD) button. Every pressing this button changes the SP → EP → SP.
d. Set the [S-VHS REC] switch to AUTO. The [S-VHS] lamp lights.

VHS mode

a. When using a S-VHS tape, set the S-VHS REC switch to OFF.
The [S-VHS] lamp goes off.
With a VHS tape loaded, the VHS mode is automatically entered.
b. Select recording speed with SP/EP button.

3 Set an optimum recording level with the AUTO CAL button as required. (See page 20).

This facility does not work for the W-VHS tape.

Basic Operations

4 Adjust the HiFi recording level.

a. Call up the audio level meter display with the DISPLAY SELECT button.
b. Select HiFi audio with the AUDIO OUT SELECT button. This shows the HiFi audio level meter display. (See page 14).
c. Adjust the recording level and L/R balance. While checking with the audio level meter, adjust with the REC LEVEL and BALANCE knobs, until the thick bars on the display occasionally swing.
Perform adjustment carefully, as too low a recording level may lead to a greater noise and too high a level may cause a distortion.

5 Start recording.

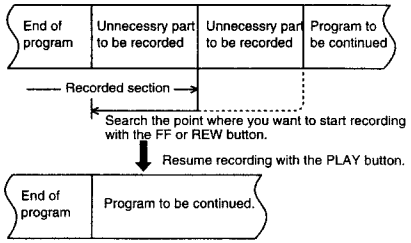
a. Press the REC button, whereupon recording starts.
b. Press the PAUSE/STILL button for a brief pause of recording.
c. Pressing the PLAY button resumes recording.
d. Press the STOP button to bring recording to an end.

When pause remains for longer than five minutes, the machine automatically stops recording to protect tape and video head from damage.

Retake Function

You can cut the unnecessary part of the program during recording. This facility does not work when using a W-VHS tape.

a. With the pause mode entered, keep pressing the REW or FF button. The tape is played back at a normal PLAY speed.
b. Leave your hand off the button at the start of the unnecessary part (where you want to adjoin the program). Pause mode resumes where your hand has left the button.
c. Press the PLAY button at the part of the program you want to continue recording. Recording resumes.


End of program
Unnecessry part to be recorded
Unnecessry part to be recorded
Program to be continued
Recorded section
Search the point where you want to start recording with the FF or REW button.
Resume recording with the PLAY button.
End of program
Program to be continued.

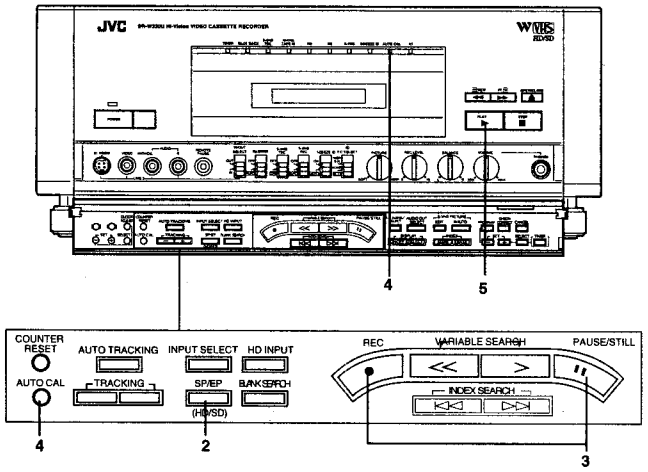
Blank Search Function

Used to search the unrecorded section of the tape.

a. With the stop mode entered, press the BLANK SEARCH button. Search stops where the unrecorded section is found.
b. Press the STOP button if you want to cancel blank search.

Note
When blank search is done, play back the tape before recording to make sure you can start recording here.

AI Auto Calibration



Checks the characteristics of the tape in use and sets the recording level to an optimum in dependence on such characteristics.
This facility does not work for the W-VHS tape.

Preparations

AI auto calibration is recorded on a section of the tape to check up the tape characteristics. It is recommended to perform this recording on a section you do not mind erasing.
Make sure that the tape is unprotected (with the safety tab).

Procedures

1 Load the tape.

2 Select recording speed with the SP/EP button.

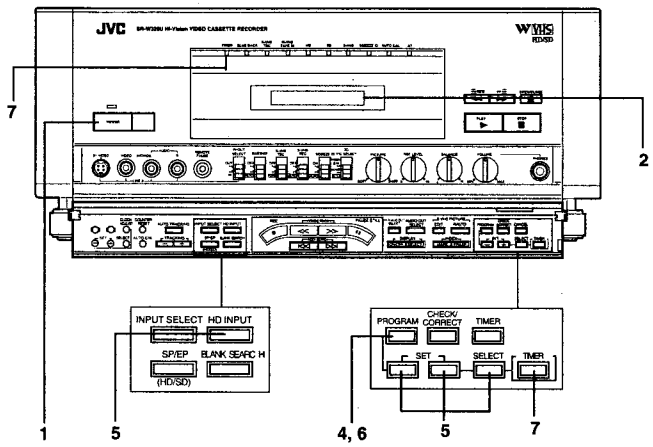
3 Engage the Record Pause mode.
While pressing the PAUSE/STILL button, press REC button.

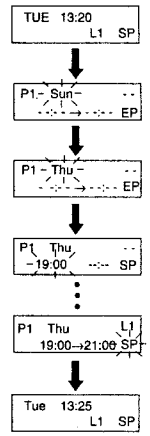
4 Keep pressing the AUTO CAL button until the AUTO CAL lamp flickers.
The machine automatically checks the tape characteristics.The record pause mode resumes after completion of adjustment. (Approx. 10 seconds)
There comes no audio during this operation. Input select is also disabled.

5 Press the PLAY button if you want to immediately start recording.
When the tape is ejected, the AUTO CAL lamp goes off and the AI auto calibration mode is canceled.

6 TIMER-PROGRAMMED RECORDING

Timer-Programmed Recording





Eight programs can be preset for two weeks ahead.
Example: Preset the program 7:00 to 9:00 pm on Thursday on L1 input at SP mode.

1 Turn the power on.

2 Make sure of the present time on the front panel display window.

3 Load a tape with safety tab (on the REC side for W-VHS tape).

4 Press the PROGRAM button.

5 Set the date, start time, end time, input select and recording speed.

Date
a. Make sure that the date display flickers.
b. Set the date with the SET ± button.
c. Pressing the + button changes Sunday → Saturday in the first week, Sunday → Saturday in the second week, Sunday → Saturday every week, Sunday → Saturday daily, Monday → Saturday daily, Monday → Friday daily and Monday → Thursday daily.
d. Pressing the – button reverses the sequence in c.
e. Press the SELECT button.

Start Time
a. Make sure that the start time flickers.
b. Set the start time with the SET ± button.
Keeping this button pressed changes the time 30 minutes by 30 minutes. Pressing one by one changes the time minute by minute.
c. Press the SELECT button.

End Time
a. Make sure that the end time flickers.
b. Set the end time with the SET ± button.
Keeping this button pressed changes the time 30 minutes by 30 minutes.
c. Press the SELECT button.

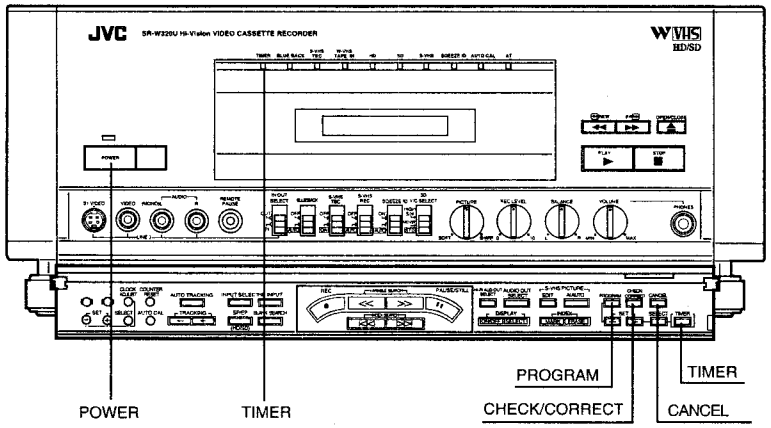
Input Select
a. Make sure that the input select display flickers.
b. Press the INPUT SELECT button to select input. Every pressing the button changes L1 → L2 → L3 → HD ....
c. Press the SELECT button.

Record Speed
a. Make sure that the record speed display flickers.
b. Set the record speed with SET ± button. With a W-VHS tape in use, the record speed is automatically set with input select.

6 Press the PROGRAM button.
The ordinary display appears. For further programming, repeat procedures 4 - 5.

7 Press TIMER button.
The TIMER lamp lights and the power goes off (Timer standby). When the TIMER lamp flickers, there is some problem with the programming procedure. Check the procedure.

Check, Correct and Cancel of the Preset Programs



Check of the Preset Programs

a. If the TIMER lamp is lit, turn this off by pressing the TIMER button.
b. Turn the power on.
c. Press the CHECK/CORRECT button. The front panel display window shows one preset program. The second and further programs can be checked by pressing the CHECK/CORRECT button.
d. Press the TIMER button. The TIMER lamp on the front panel lights and the power is turned off.

Correction of the Preset Programs

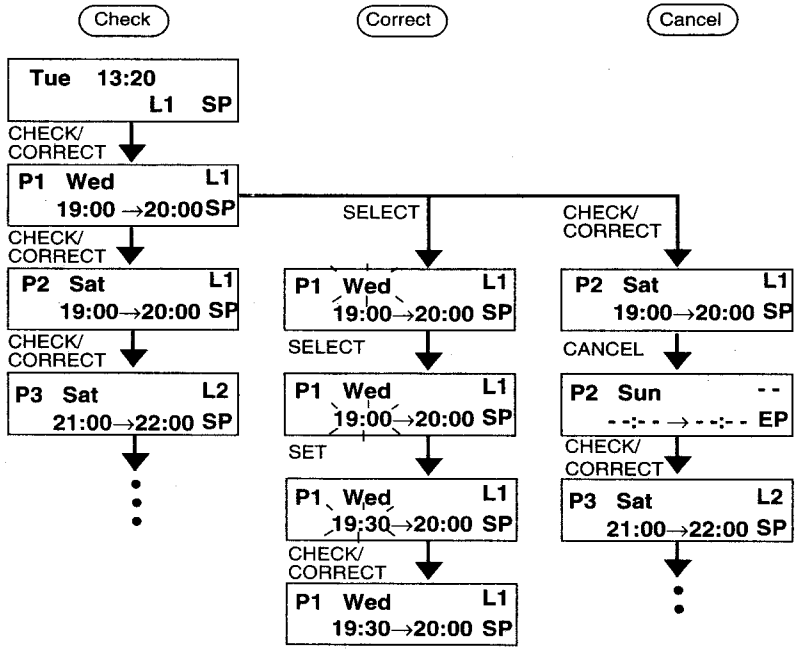
a. Correction can be made even with the TIMER lamp lit (TIMER standby). Correction is not possible during recording the timer preset programs.
b. Press the CHECK/CORRECT button. The front panel display window shows one preset program.
c. Call up the preset program which you want to correct with the CHECK/CORRECT button.
d. Make the data you want to correct flick with the SELECT button.
e. Correct with the SET ± button.
f. Fix the corrected data with the CHECK/CORRECT button.

Cancel of the Preset Programs

a. If the TIMER lamp is lit, turn this off by pressing the TIMER button.
b. Turn the power on.
c. Call up the preset program which you want to cancel with the CHECK/CORRECT button.
d. Press the CANCEL button. The selected preset program is canceled.
e. Press the CHECK/CORRECT button. With the button pressed, the preset programs are displayed to an end and resumes the beginning.
f. To enter the timer standby mode, press the TIMER button and light the TIMER lamp.

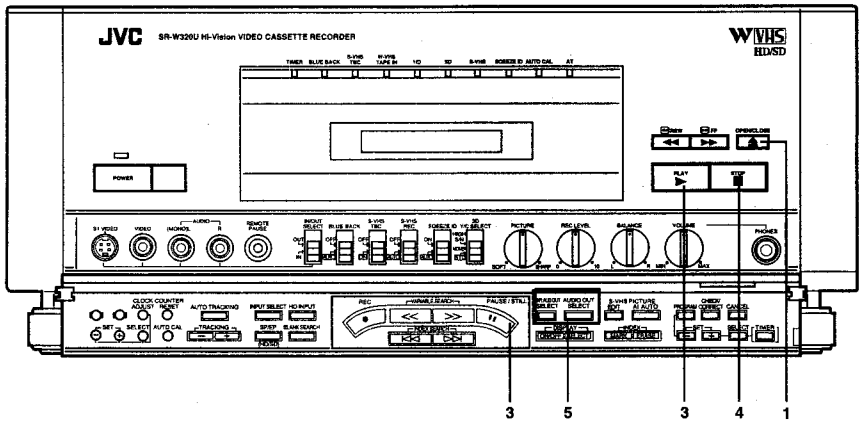
Check, Correct and Cancel of the Preset Programs

The data display on the front panel display window changes as follows for check, correct and cancel of the preset programs.



7 PLAYBACK

Basic Procedure



1 Press OPEN/CLOSE button.
The door opens.

2 Load the tape.
The power is turned on. Playback automatically starts with the tape protected (without safety tab).

3 Press the PLAY button.
Playback starts.
Press the PAUSE/STILL button to obtain a still picture. Playback resumes by pressing the PLAY button.
To monitor the HD-recorded tape, set the input select switch on the high vision TV to HD input. No picture comes out of the S1 video and video output connectors.

4 Press the STOP button to bring the playback to an end.

Notes
- With the still picture or slow play remaining for longer than five minutes, the STOP mode is automatically entered to protect the tape from damage.
- In HD mode, the still picture may fail to come up when quickly switching from PLAY to STILL.

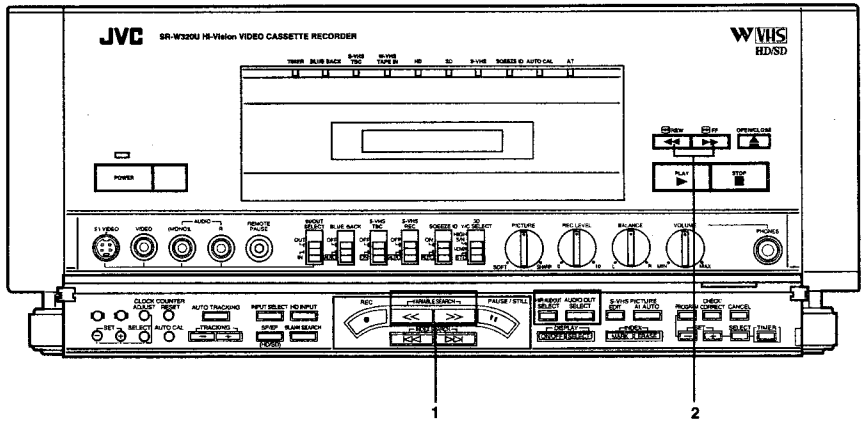
Audio Select

5 How to HiFi audio channel?
a. Select with the HiFi AUD SELECT button.
Every pressing the button changes HiFiL,R → HiFiL → HiFiR →
HiFi L : Left channel
HiFi R : Right channel
b. When checking the audio output display with the front panel display window, call up the audio level meter with the DISPLAY SELECT button.

When selecting a reproduced audio (HiFi audio/ normal audio/ mix audio)
a. Select with the AUDIO OUT SELECT button.
Every pressing the button changes HiFi audio → normal audio → Mix audio (HiFi and normal).
The tape for which HiFi audio has not been recorded reproduces normal audio.
b. To check the audio output display on the front panel display window, call up the audio level meter with the DISPLAY SELECT button.

Note
Since normal audio is not recorded on a W-VHS tape, selection between normal and mix audio is not possible on such tape.

Special Playback Procedures



Variable Speed Payback

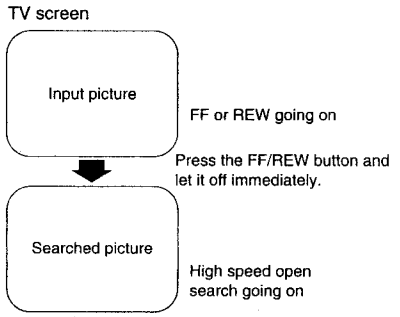
1 Press FF or REW button to fast forward or rewind during playback.

How to press the FF and REW buttons	REC mode				How to cancel the variable speed playback
	S-VHS /VHS tape		W-VHS tape		
	SP	EP	HD	SD	
Press and immediately let your hand off (latch)	about11 X speed	about30 X speed	about6 X speed	about7 X speed	Pressing the PLAY button resumes normal playback.
Keep pressing	about7 X speed	about7 X speed	about6 X speed	about7 X speed	Letting your finger off resumes normal playback.

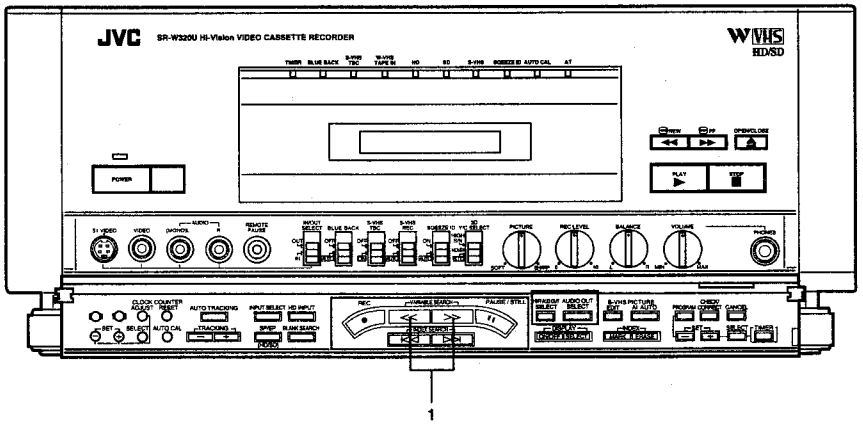
Monitoring the Video during FF or REW

2 Video can be monitored by pressing the FF button during fast forward or the REW button during rewinding and immediately letting your hand off the buttons. (High speed open search)
This facility does not work for the W-VHS tape.

Notes
- When the start or end of the tape is reached during high speed open search, FF or REW automatically resumes to protect the tape from damage.
- High speed open search may not take place around the center of a long-time tape (T-160, T-168 and T-180).

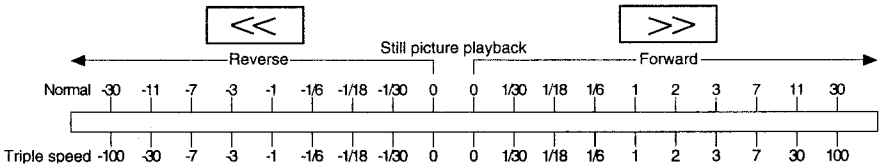

TV screen
Input picture
FF or REW going on
Press the FF/REW button and let it off immediately.
Searched picture
High speed open search going on

Special Playback Procedures



Variable Speed Playback with the VARIABLE SEARCH button

- During playback or still picture playback, search speed can be varied upon every pressing the VARIABLE SEARCH button.
- Still picture playback comes up when the reverse button is pressed during variable search playback.
- This facility does not work for a W-VHS tape in use.

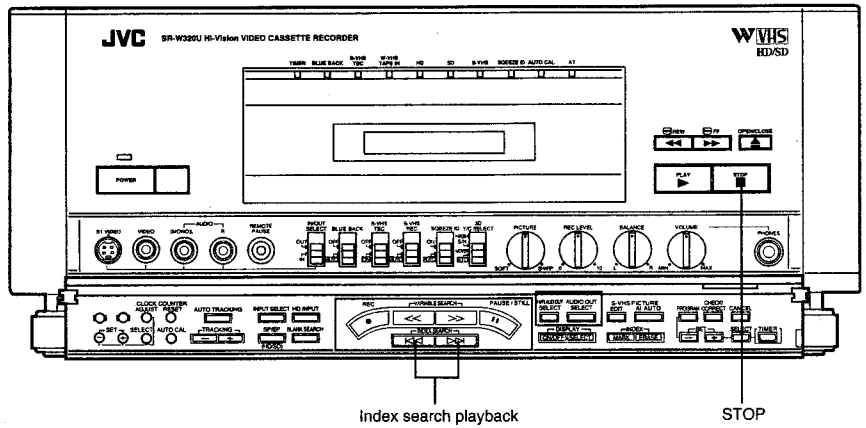


- There is no audio heard during skewless fine search *1, hyper strobe search *2, high speed picture search and variable speed playback with the VARIABLE SEARCH button.
- When the still picture playback or slow playback stays for longer than five minutes, the tape is automatically brought to a stop to protect itself from damage.
- When the tape recorded at EP mode is played back at 100 times speed (hyper strobe search), color may appear somewhat faded.

*1: Fast forward/rewind playback of S-VHS/VHS is particularly referred to as skewless fine search.

*2: 30 X speed (SP mode) and 100X speed (EP mode) search is particularly referred to as hyper strobe search.

Index Search

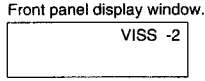


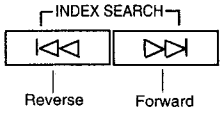
Index search playback

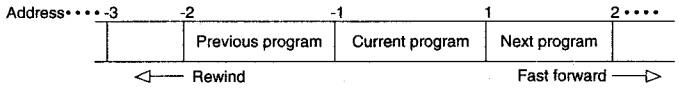
This facility searches the index signal recorded on the tape where playback starts.

a. Press the INDEX SEARCH button during stop or playback to specify a desired address.
   Every pressing the forward button increments the number and pressing the reverse button decrements the number. Address up to ±No. 9 can be specified.
b. The specified address is automatically searched, whereupon the tape is automatically played back.
c. Press the STOP button to cancel this search en route.

Front panel display window.



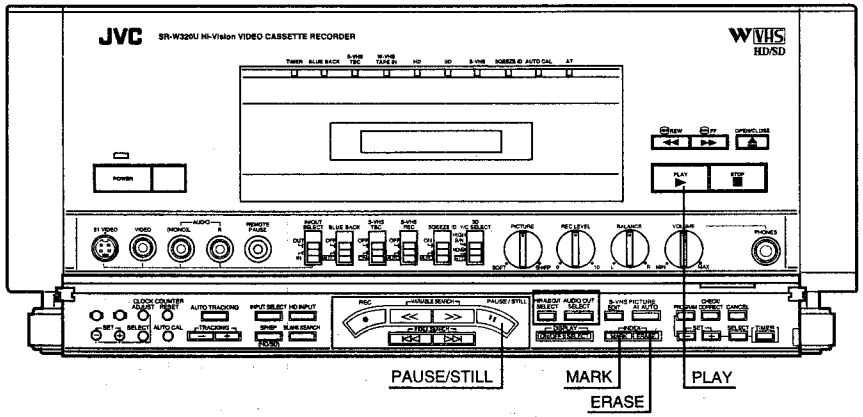




How to count the address

- When searching the previous program
  Press twice the INDEX SEARCH button in rewind direction.
- When searching the next program
  Press once the INDEX SEARCH button in forward direction.

Index Search



Recording the Index Signal

Index signal can be recorded on an arbitrary section of the tape.
Index signal is automatically recorded at in the beginning of recording and timer-programmed recording.

During recording or playback

Press the INDEX MARK button.
VISS MARK flickers on the front panel display window, whereupon the index signal is recorded.
The VISS MARK goes off, finishing the recording procedure.

During Recording Pause or Still Picture Playback

a. Press the INDEX MARK button.
VISS MARK is shown on the front panel display window.
b. Press the PLAY button.
VISS MARK flickers, whereupon the index signal is recorded.
c. VISS MARK disappears, finishing the recording procedure.

Front panel display window.

VISS MARK

Erasing the Index Signal

The index signal recorded on the tape can be erased.
a. Enter playback or still picture playback several seconds before the index signal to be erased.
b. Press the INDEX ERASE button.
VISS ERASE is shown on the front panel display window.
The tape automatically runs to erase the index signal .
c. The VISS ERASE display disappears, finishing the erasure of the index signal.
Tape goes on playing back.

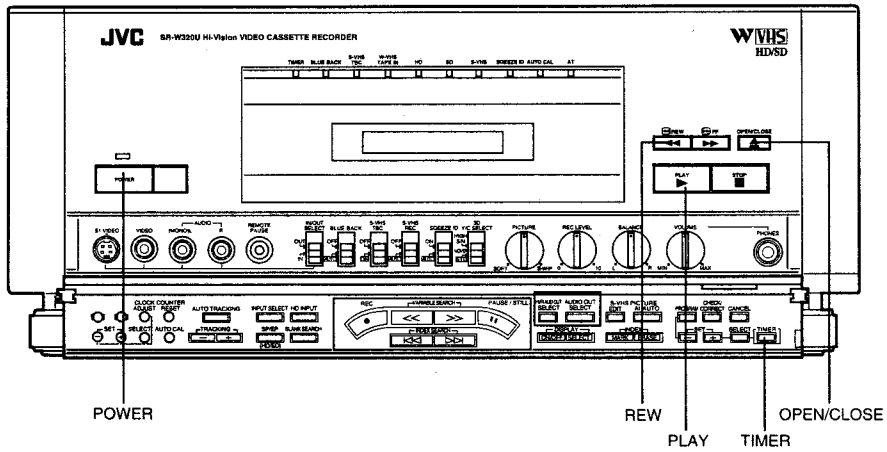
Front panel display window.

VISS ERASE

Notes

- When recording an index signal on a recorded tape, perform it in the playback mode. In record mode, previous video or audio will be erased.
- record an index signal at a due distance from a neighboring index signal to avoid operational error.
- With VISS MARK or VISS ERASE shown on display, do not operate other buttons.
- If the record speed is changed from SP to EP near the index signal, the picture may be disturbed after recording or erasing the index signal is finished.
- Recording or erasure cannot take place on a protected tape (without safety tab) or an unrecorded tape.

Next Function



Next Function Facilities

When the tape is rewound to the beginning, such functions can be automatically executed as automatically unloading the cassette, setting the timer standby and turning the power off.

- To play back
Press the PLAY button immediately after pressing the REW button.
PLAY flickers on the front panel display window.
Playback automatically starts at the beginning of the tape.

- To unload the cassette
Press the OPEN/CLOSE button immediately after pressing the REW button.
EJECT flickers on the front panel display window.

- To set the timer standby.
Press the TIMER button immediately after pressing the REW button.
The POWER lamp flickers and the TIMER lamp lights.
The timer standby is automatically entered at the beginning of the tape.

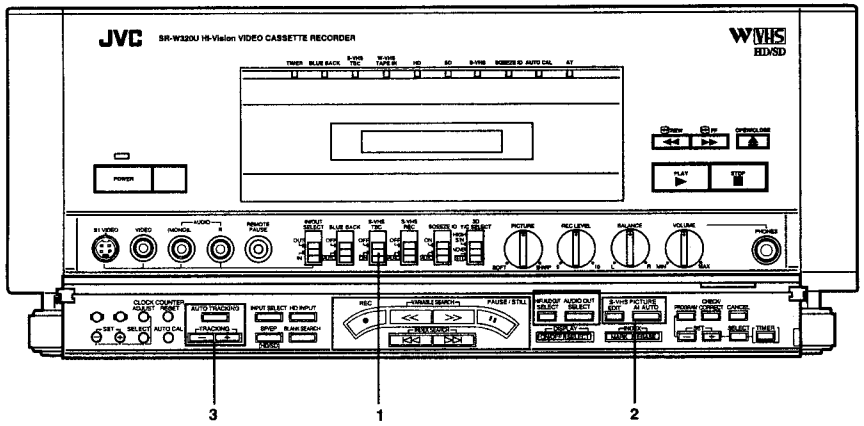
- To turn the power off
Press the POWER button immediately after pressing the REW button.
The POWER lamp flickers.
The power is turned off at the beginning of the tape.

Next Function Super Rewind

- Using the next function memory facility around the end of a long time tape such as T-120 tape, the tape can be rewound in a shorter time than with the usual rewind.
- A bar graph is shown on the front panel display window (in counter display mode) to indicate how far rewind goes on.
- Normal rewind speed may resume for a T-60 or shorter tape or a VHS-C tape, or depending on the winding position of the tape.
- When the NF (next function) super rewind is finished, the counter display returns to 0:00:00. The same occurs when this facility is canceled en route.

Front panel display window.

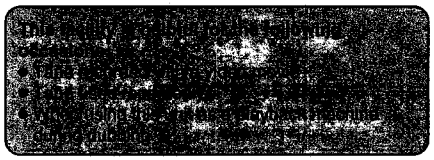
Adjustment of the Playback Picture



To correct distortion of the picture

1 Set the S-VHS TBC switch to ON.

- With this switch set to ON, the picture may not be clearly visible, depending on the signal recorded on the tape. In that case, the picture may be better by setting the switch to OFF.
- When playing back a W-VHS tape, TBC for W-VHS works regardless of the switch position.



How to select the video quality matching the tape in use

2 Select the type of video quality with the AI AUTO or EDIT button.

AI AUTO	Standard
EDIT	For dubbing

Front panel display window.

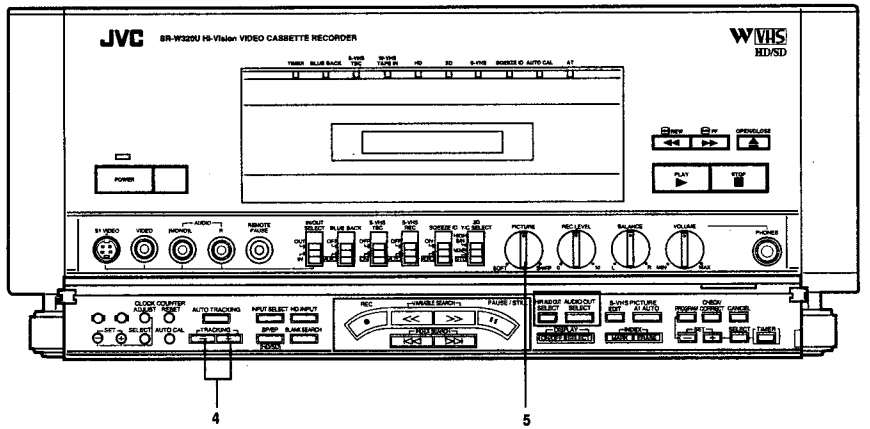
1 : 23 : 45	
AI AUTO	L1 SP

When there is too much noise in the picture

3 Press the AUTO TRACKING button to light the AT lamp. The noise associated with the tape recorded on another machine is automatically minimized.

- This facility does not work with the W-VHS tape in use.

Adjustment of the Playback Picture



When noise comes up during still picture/slow picture playback

4 a. Set to slow playback.
b. Adjust with the TRACKING -/+ button.

- This facility does not work with the W-VHS tape in use.
- Tracking adjustment may not be quite successful when playing back the tape with a poor recording quality.

To select your desired picture tone

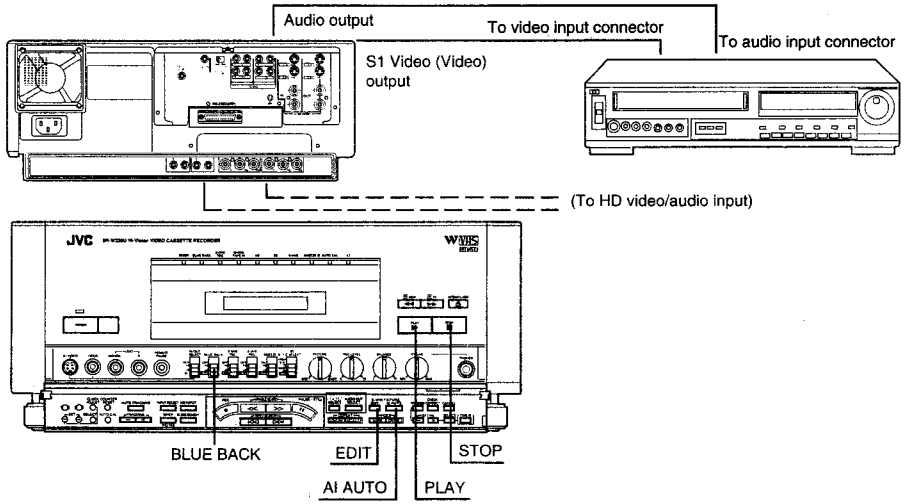
5 Adjust the picture with PICTURE adjust knob.

Soft: Soft-tone picture with noise less outstanding
Sharp: Sharp, clear-cut picture

- Usually set to the center.
- This facility does not work with the W-VHS tape in use.
- This facility does not work when the EDIT botton is set .

8 TAPE DUBBING

When Playing Back on SR-W320U and Recording on Another Unit



SR-W320U (as a playback machine)

1 Call up " EDIT" on front panel display window with the EDIT button.
- This facility does not work when the W-VHS is in use.

Another unit (as a recording machine)

2 Set the recording machine to external input.
3 Put the recording to a pause.

SR-W320U (as a playback machine)

4 Start playback shortly before the section where you want to PLAY.

Another unit (as a recording machine)

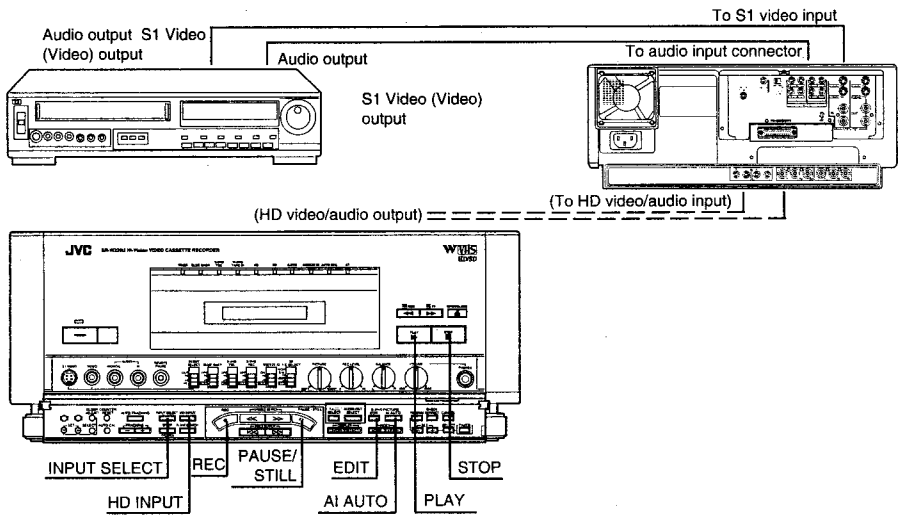
5 Start recording at a section of the program you want to dub.
6 To finish, press the STOP button. Extra recording can be avoided by stopping the recording machine then the SR-W320U.

SR-W320U (as a playback machine)

7 Press the STOP button.
8 Press the AI AUTO button and call back the video status display.

- When dubbing a high vision video, use the HD video cable, provided that the recording VCR is equipped with the HD video input and HD audio input connectors.

When Playing Back on Another Unit and Recording on SR-W320U



SR-W320U (as a recording machine)

1 Call up " EDIT" on front panel display window with the EDIT button.
- This facility does not work when the W-VHS is in use.

2 Select the input in connection by pressing the INPUT SELECT button.
3 Press the REC button while pressing the PAUSE button to bring recording to a pause.

Another unit (as a playback machine)

4 Start playback shortly before the section where you want to dub.

SR-W320U (as a recording machine)

5 Press the PLAY button at a section where you want to dub.
6 To bring recording to a pause, press the PAUSE button.
7 To finish, press the STOP button.
- Extra recording can be avoided by stopping the SR-W320U then the playback machine.

Another unit (as a playback machine)

8 Press the STOP button.

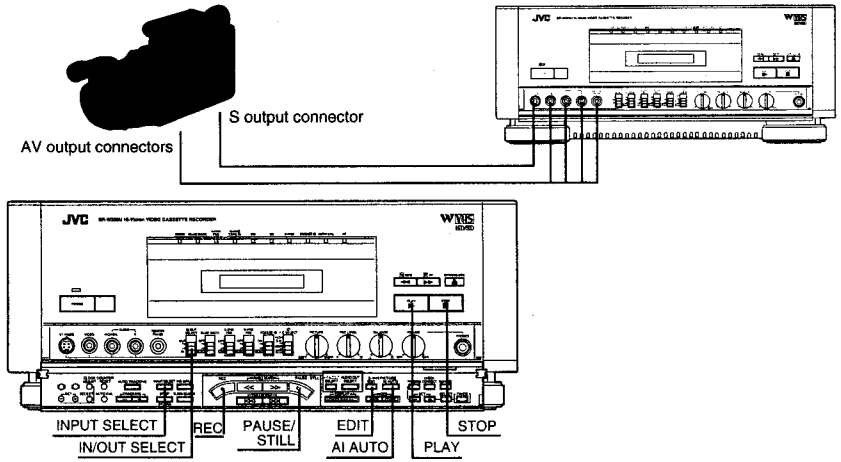
SR-W320U (as a recording machine)

9 After finishing dubbing, press the AI AUTO button and call back the video status display.

- When dubbing a high vision video, use the HD video cable, provided that the recording VCR is equipped with the HD video output and HD audio output connectors.
- When dubbing from an audio unit, record the video together with the audio.
- When record pause stays for longer than five minutes, the machine automatically stops to protect the tape and video heads from damage.

- What you have recorded on the video cassette recorder cannot be used without approval of the copyright holder, except that it is solely for personal amusement.

When Playing Back on a Video Move and Recording on SR-W320U



- When dubbing, REC start/stop on this machine can be controlled from the video movie (Master) unit connected.
- This will be operable when connected with a JVC's video movie.
- Please read the instruction manual of the video movie.

SR-W320U (as a recording machine)

1 Call up " EDIT" on front panel display window with the EDIT button.
- This facility does not work for the W-VHS tape in use.

2 Set the IN/ OUT SELECT switch to IN.
3 Select L3 with the INPUT SELECT switch.
4 Press the REC button while pressing the PAUSE button to bring recording to a pause.

Video movie (as a playback machine)

5 Put the video movie to a still playback mode at a section you want to dub.
6 Press the EDIT button.

SR-W320U (as a recording machine)

7 The machine starts recording.

Video movie (as a playback machine)

8 Press the PAUSE button at a section where you want to stop.

SR-W320U (as a recording machine)

9 Recording is brought to a pause.

Video movie (as a playback machine)

10 When resuming recording, press the EDIT button.

SWR-320U (as a recording machine)

11 Recording is re-started.

Video movie (as a playback machine)

12 When finishing, press the STOP button.

SR-W320U (as a recording machine)

13 The machine is brought to a pause.
14 Finish with the STOP button.
15 Press the AI AUTO button and call back the VIDEO STATUS display.

- When SD-recording with the SR-W320U by playing back a tape having edit points, pictures may be distorted at these edit points.
- When record pause stays for longer than five minutes, the machine automatically stops to protect the tape and video heads from damage.

9 RS-232C INTERFACE

RS-232C PROTOCOL

This chapter is dedicated to the user who intends to program for controlling the SR-W320U through the RS-232C.

JVC BASIC TABLE List of commands

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				Data "0"	ENTER											
1	COMPLETION			Data "1"	CLEAR ERROR											
2	ERROR			Data "2"								CUE UP WITH Data			COUNTER RESET	
3	CASSETTE OUT			Data "3"							EJECT					
4				Data "4"												
5	NOT TARGET			Data "5"								F-SHUTTLE				
6				Data "6"		CLEAR						R-SHUTTLE		W-VHS STATUS SENSE		JVC TABLE1 ON
7				Data "7"										STATUS SENSE	TIMER MODE SELECT	JVC TABLE1 OFF
8				Data "8"												
9				Data "9"										CURRENT CTL SENSE		
A	ACK			PLAY	REV×1								REC			REC REQUEST
B	NAK										FF		REC PAUSE			VTR INQ
C				FWD ×1/6	REV ×1/6						REW					
D				F-STILL	R-STILL						F-FIELD STEP					
E				FWD ×7	REV ×7						R-FIELD STEP					
F				STOP	STILL											

JVC TABLE 1 List of commands

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				Data "0"	ENTER											
1	COMPLETION			Data "1"	CLEAR ERROR									DEVICE TYPE		
2	ERROR			Data "2"				ROM VER.				CUE UP WITH Data			COUNTER RESET	
3	CASSETTE OUT			Data "3"							EJECT					
4				Data "4"												
5	NOT TARGET			Data "5"								F-SHUTTLE				
6				Data "6"		CLEAR						R-SHUTTLE		W-VHS STATUS SENSE		JVC TABLE1 ON
7				Data "7"										STATUS SENSE	TIMER MODE SEL	JVC TABLE1 OFF
8				Data "8"												
9				Data "9"										CURRENT CTL SENSE		
A	ACK			PLAY									REC			REC REQUEST
B	NAK							OPERATE ON			FF		REC PAUSE			VTR INQ
C								OPERATE OFF			REW					
D											F-FIELD STEP					
E											R-FIELD STEP					
F				STOP	STILL											

Note: Do not use any command other than listed above.

Commands

The commands to control the SR-W320U through the RS-232C interface are given below. See the pages mentioned for details.

VCR control commands	See page ...
OPERATE ON/OFF PLAY/REV×1 STILL FWD×1/6/×7/STILL REV×1/6/×7/STILL STOP FF/REW F-FIELD STEP R-FIELD STEP EJECT	Page 36
CUE UP WITH DATA F-SHUTTLE R-SHUTTLE REC/REC PAUSE	Page 37
COUNTER RESET TIMER MODE SEL	Page 36

VCR information gathering commands	See page ...
ROM VER. DEVICE TYPE VTR INQ	Page 37
W-VHS STATUS SENS STATUS SENS CURENT CTL SENS	Page 38 Page 37 Page 37

Return codes from VCR	See page ...
ACK NAK ERROR CASSETTE OUT COMPLETION NOT TARGET	Page 36 Page 39 Page 39 Page 39 Page 39 Page 39

Others	See page ...
JVC PAGE 1 ON ENTER CLEAR ERROR	Page 39 Page 39 Page 39

Commands Description

VCR control commands

A command complete with one byte. The VCR returns ACK (0Ah) when it normally receives the command.

Note:

- The commands marked with * cannot be used in HD/SD mode.
- When issuing commands sequentially, be sure to check for ACK before sending the next command.

OPERATE ON		7Bh	Turns the VCR's power on.
OPERATE OFF		7Ch	Turns the VCR's power off.
PLAY		3Ah	Play
STILL		4Fh	Pause
REV×1	*	4Ah	-1× speed playback
FWD×1/6	*	3Ch	Forward 1/6× speed playback
FWD×7	*	3Eh	Forward 7×speed playback
REV STILL	*	3Dh	Forward Pause
REV×1/6	*	4Ch	Reverse 1/6×speed playback
REV×7	*	4Eh	Reverse 7×playback
REV STILL	*	4Dh	Reverse pause
STOP		3Fh	Stop
FF		ABh	Fast forward
REW		ACh	Rewind
F-FIELD STEP	*	ADh	During pause, field advances one by one in forward direction and comes to a pause.
R-FIELD STEP	*	AEh	During pause, field advances one by one in reverse direction and comes to a pause.
EJECT		A3h	Removes the cassette

The following are the 2 bytes or more commands and those consisting of numerical data.

COUNTER RESET E2h

Counter resets with this command followed by ENTER (40h)

TIMER MODE SEL E7h

Selects timer modes such as CTL, LTC, VITC. Fixed at CTL MODE in this unit.
ACK (0Ah) is returned in respond to this command followed by 32h. NAK (0Bh) is returned in response to the following data.

31h: LTC MODE
35h: LTC UB MODE
38h: VITC MODE
39h: TC AUTO MODE
3Ch: VITC UB MODE
3Dh: UB AUTO MODE

REC (CAh)

- REC MODE entered in response to REC REQ CMD (FAh) followed by this command.

REC PAUSE (CBh)

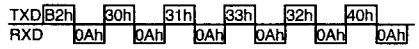
- REC PAUSE MODE entered in response to REC REQ CMD followed by this command.
- NAC (0Bh) is returned when the cassette loaded has its safety tab broken.

CUE UP (B2h)

WITH DATA

- CUE UP can be set at a desired position of the tape by sending this command followed by arbitrary numerical data (30h - 39h).

Example) Set 1 hour 32 minutes.



- CUE UP operation is entered by sending ENTER CMD (40h) at the end of the numerical data.
- STOP MODE is entered when CUP UP is finished and COMPLETION (01h) is returned.
- If CUE UP position is not found, NOT TARGET (05h) is returned.
- NAK (0Bh) is returned when sending the data outside the frame of 9 hrs. 59 min. 59 sec. 29 in forward direction and the frame of 9 hrs. 59 min. 59 sec. 29 in reverse direction.
- PLAY is entered after CUE UP with JVC TABLE 1 ON.

F-SHUTTLE* (B5h)

- With this command followed by numerical data, search in forward direction is executed at a tape speed responsive to the data.

R-SHUTTLE*(B6h)

- With this command followed by numerical data, search in reverse direction is executed at a tape speed responsive to the data.

Numerical data vs. Numerical data	SHUTTLE SPEED SPEED
30h	STILL
31h	1/30
32h	1/18
33h	1/6
35h	1
36h	3
37h	7
38h	11
39h	30

Commands for gathering various items of VCR information

ROM VER. (72h)

Returns the current ROM version.
1st byte 21h Indicates RS-232C
2nd byte 03h In case of SR-W320U
3rd byte **h Current ROM version

VTR INQ (FBh)

Returns ACK (0Ah) when VCR is connected.

DEVICE (D1h)

Returns the lower four characters of the SR-W320U model name by means of ASCII code.
W:57h 3:33h 2:32h 0:30h

CURRENT (D9h)

CTL SENS

Returns the address on CTL counter.

SENS

Returns the status of VCR in 5 bytes. Each byte signifies as follows.

1st byte

BIT No.	STATUS	When BIT is 1
0	ERROR	Receives an unacceptable command. This makes other, succeeding commands unacceptable. To cancel this mode, send CLEAR ERROR (41H) to VCR.
1	Always 0	
2	SERVO LOCK	Not compatible.
3	CASSETTE OUT	No cassette loaded.
4	REC INHIBIT	Cassette with safety tab broken.
5	SHORT FF/REW	Not compatible.
6	Always 0	
7	Always 1	

2nd byte

BIT No.	STATUS	When BIT is 1
0	TAPE END	SHORT REW is entered by detecting white noise at the end of the tape.
1	TAPE BIGIN	SHORT FF is entered by detecting white noise at the beginning of the tape.
2	DEW	Dewed.
3	WARNING	Not compatible.
4	AUDIO MUTE	Not compatible.
5	VIDEO MUTE	Not compatible.
6	AUDIO EE	EE signal is fed to the AUDIO output.
7	VIDEO EE	EE signal is fed to the VIDEO output.

3rd byte

BIT No.	STATUS	When BIT is 1
0	NOT defined	
1	SEARCH MODE	CUE UP or INDEX search going on.
2	REPEAT MODE	Not compatible.
3	NOT defined	
4	REPEAT	Not compatible.
5	COUNTER SEARCH	Not compatible.
6	TIMER REC	TIMER REC standby or REC going on.
7	TIMER PLAY	Not compatible.

4th byte

BIT No.	STATUS	When BIT is 1
0	A.DUB MODE	Not compatible.
1	REC MODE	Recording going on.
2	EJECT	Unloading the tape.
3	STAND BY MODE	Stand by mode on.
4	STOP MODE	Stop mode on.
5	REW MODE	Rewind going on.
6	FF MODE	Fast forward going on.
7	PALY MODE	Play mode on.

5th byte

BIT No.	STATUS	When BIT is 1
0	SPEED CODE0	Indicates the current running mode of VCR. See separate table.
1	SPEED CODE1	
2	SPEED CODE2	
3	SPEED CODE3	
4	SHUTTLE REV	Shuttle rewind going on.
5	SHUTTLE FWD	Shuttle forward going on.
6	LONG PAUSE MODE	
7	PAUSE MODE	Pause mode on

SPEED CODE				SHUTTLE SPEED
BIT No. 32	1	0	Hex	
00	0	0	0h	STILL
00	0	1	1h	1/30
00	1	0	2h	1/18
00	1	1	3h	1/6
01	0	1	5h	1
01	1	0	6h	3
01	1	1	7h	7
10	0	0	8h	11
10	0	1	9h	30
10	1	0	Ah	100

W-VHS STATUS SENS

VCR returns the W-VHS related data in consecutive 4 bytes. Each byte signifies as follows.

1st byte

BIT No.	STATUS	When BIT is 1
0	HI FI Lch AUDIO	L1 or L3 is selected as input.
1	HI FI Rch AUDIO	L2 is selected as input.
2	NORMAL AUDIO	HD input is selected as input.
3	Not defined.	
4	JVC TABLE 1	JVC TABLE 1 OPEN
5	JVC TABLE 2	JVC TABLE 2 OPEN
6	Always 0.	
7	Always 1.	

2nd byte

BIT No.	STATUS	When BIT is 1
0	HI FI Lch AUDIO	HIFI Lch is selected as output.
1	HI FI Rch AUDIO	HIFI Rch is selected as output.
2	NORMAL AUDIO	Normal audio is selected as output.
3	EP	EP mode.
4	S-VHS	S-VHS lamp is lit.
5	HD MODE	HD lamp is lit.
6	SD MODE	SD lamp is lit.
7	FULL MODE	SQUEEZE ID lamp is lit.

3rd byte

BIT No.	STATUS	When BIT is 1
0	W-VHS TAPE IN	W-VHS lamp is lit.

1 BIT to 7 BIT of the 3rd byte and the 4th byte in all are not defined yet.

Others

ERROR (02h)

When VCR receives an unacceptable command in 2nd and succeeding bytes of a multiple byte command, it returns ERROR message. Any command is then no longer accepted, except for status sens.

To cancel this state, send CLEAR ERROR (41h) or CLEAR (56h) to VCR.

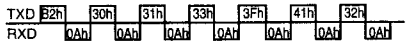
CLEAR (41h)

ERROR

Cancels one byte immediately before numerical data input. Clears the error state.

When setting one hour 32 min. with CUE UP WITH Data CMD, 3Fh which is not numerical data (30h - 39h) has been input in mistake.

Clear 3Fh with 41h and input 32h.



CLEAR (56h)

Clears all the commands. Current modes are canceled and VCR is brought to a stop. Clears error.

NAK (0Bh)

Returned when receiving the command undefined in 1st byte or the command unable to function as VCR. There is no need of clear.

COMPLETION (01h)

Returned when CUE UP is finished with CUE UP WITH Data CMD.

NOT TARGET (05h)

Returned when CUE UP position is not found with CUE UP WITH Data CMD.

CASSETTE (03h)

OUT Returned when unloading the tape is finished.

JVC TABLE1 (F6h)

ON Makes JVC BASIC TABLE, JVC TABLE 1 commands available.

JVC TABLE1 (F7h)

OFF Makes only JVC BASIC TABLE commands available.

ENTER (40h)

Send after the numerical data of COUNTER RESET CMD or CUE UP WITH Data CMD to inform VCR of data finished.

Specifications

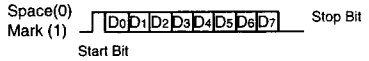
24 pin specifications

Pin No.	Signal	Subject	Direction of signals
1	FG	Frame	Ground
2	TXD	Transmit data	VTR→EXT.CPU
3	RXD	Recieve data	VTR→EXT.CPU
6	DSR	Data set Ready	VTR→EXT.CPU
20	DTR	Data Terminal Ready	VTR→EXT.CPU
7	GND	Signal Ground	

Data format

Mode:	No Syncronization
Charactor length:	8bit
Data rate:	9600bps
Parity:	No
Start bit:	1 bit
Stop bit:	1bit

Data configuration



10 TROUBLESHOOTING

No power comes up.

Is power cable plugged into the AC outlet?
Is the TIMER lamp on?

The power goes off.

If the temperature inside the machine rises to an abnormal level, the protective circuit automatically turns the power off. Place the machine so that the fans are clear of any obstacle.

Cassette does not go into the loading slot.

Re-load it in correct direction.

Cassette does not come out.

Is recording still on or is the TIMER lamp lit?

Noise appears on part of the picture.

Is the AT (auto tracking) lamp lit?
If noise still comes up with the AT lamp lit, adjust tracking manually.

No HiFi audio is heard.

Call up L and R on TV screen with the HiFi AUDIO button or the AUD OUT SELECT button.
HiFi is not obtained with the video source which is not HiFi recorded or the tape recorded with a video movie.

Noise appears during variable search.

Not an error. Noise may appear when varying playback speed.

Recording impossible.

Is the cassette safety tab not broken?

Timer-programmed recording impossible.

Is the current time setting correct?
Is the cassette safety tab not broken?
Is the TIMER lamp lit?
Check the programmed details.
Timer-programmed recording does not take place correctly when there has been a power breakdown.

TIMER lamp flickers.

Since there is any problem with programmed data, check them and reset the data correctly.
Is the cassette in the loading slot?
Load the cassette with safety tab.

The cassette comes out when pressing the TIMER button.

Load the cassette with safety tab.

0:00 flickers on the front panel display window.

There occurred a power breakdown. Redo the current time setting.

If you want to do something on the machine during timer recording or timer standby,

Press the TIMER button and turn the TIMER lamp off, then do whatever you want.

Timer-programmed recording of a program across 0:00 midnight.

(Example) When recording a program from 11:00 pm Monday to 1:00 am Tuesday, set the date of start time. In the example, set the end time to 1:00 Monday.

The programmed recording display disappears during timer programming.

When leaving the machine as it is during timer programming for approx. one minute, the programmed data is erased. So, it is required to program again.

The cassette pops out during timer recording, with the TIMER lamp flickering.

The tape is recorded up to the end of the tape.
Press the TIMER button and turn the TIMER lamp off.
Before timer programming, check the time to be set and how much of the tape still remains blank.

When one program is laid on another in timer programming.

Later program does not start recording until the recording the former program is finished.

No playback picture on TV.

When watching a HD-recorded tape, set the TV's input select switch to HD input.
When playing back SD/S-VHS/VHS, set the TV's input select switch to VIDEO INPUT.

SP (HD)/EP (SD) is not selectable.

With a W-VHS tape in use, SD mode is automatically entered by setting the input to L1 - L3, and HD mode is entered by selecting the HD input. There is no need of select operation.

Dubbing impossible.

When the external unit is connected to the front panel input connector, set the IN OUT SELECT switch to IN and select L3 with the INPUT SELECT switch.
When the external unit is connected to the rear panel input connector, select L1 (L2 or HD) with the INPUT SELECT button.

* As this unit uses a microcomputer, it may not function correctly due to noise from outside or interference noise. In this case, unplug the power cord and plug it again. Then, check the operation.

Technical Guide

W-VHS-related technologies

W-VHS is the next-generation format compatible with HDTV while taking advantage of the technical assets of VHS. W-VHS provides three modes: HD (High-Definition) mode capable of recording and playback high vision signals; SD (Standard Definition) mode for recording the existing TV signals with a high picture quality ; and SD2 mode capable of recording the existing TV signal in two separate, parallel lines, which will find interesting applications in future. This machine is compatible with two of these three modes, HD and SD modes.

■ High-quality video heads (HD/SD/S-VHS/VHS)

Picture quality of a video cassette recorder depends on video heads. The SR-W320U is equipped with specially developed high-quality heads separately for HD/SD and S-VHS/VHS modes.

Sendust HD Pro-head (HD/SD)

Since W-VHS uses a metal tape, a greater quantity of information must be transmitted between the tape and the head than with S-VHS/VHS, resulting in severe demand imposed on the head.

Sendust Pro Head is made of Sendust alloy, not only at the gap section but also over the entire magnetic path. This has achieved superb recording characteristics throughout the whole range from low to higher frequencies, while suppressing noise during playback.

In HD mode, two heads must be always in contact with the tape because 2 channel parallel recording is executed. Since the tape is wound around only half the circumference of the rotary drum supporting the head, four Sendust HD Pro heads are place in two pairs, opposite to each other at an angle of 180° over the rotary drum.

Super Crystal Pro head (S-VHS/VHS standard mode)

A pair of heads are used for recording and playback of video signals. The track width has been made different between the two heads to ensure a high picture quality even during special playback such as search. Super Crystal Pro heads have track widths optimumly selected for excellent picture quality, which are in good balance with each other with minimum interference from the neighboring track. The narrower track is now 17% wider than before. All this has led to well-balanced head characteristics and therefore to further enhanced picture quality.

■ HD baseband recording

In W-VHS, high-vision signals are recorded and played back with component baseband signals, without using the method of improving resolution by means of bandwidth compression such as MUSE. Since the signals input are thus recorded and played back as they are, the resultant picture is free from the signal format restrictions and appears quite natural with no "bias" associated with compression.

■ W-VHS high-performance metal tape

In order to ensure high picture quality of high vision signals on baseband, it is necessary to record signals with a wider frequency range on the tape. To this end, W-VHS uses a newly developed metal tape whose high-range characteristics are 8 dB or more better than in conventional tapes. This metal tape enables you to enjoy high vision pictures with enhanced quality for a prolonged period, using the cassette as small as the conventional-format tapes.

■ Two-track parallel recording

Since high vision signals are packed with the quantity of information four or five times greater than existing TV signals, it is difficult to ensure necessary technical resources merely by development of a single technical element such as introducing a high-performance tape.

W-VHS HD mode has resolved this problem by developing and establishing a challenging method: to handle this immense quantity of information, a high-vision signal is divided into two parts by digital signal processing, the two parts then being recorded and played back using two video signal tracks together.

In playback, the two signals from separate tracks are combined together to rebuild the original high vision signal. That is, there is no loss of information during high vision recording on the tape.

■ Vertical emphasis

There are a number of technical approaches to reduce noise. The simpler and easier one of those approaches is cut out small signals by regarding them simply as noise. This could not be a good idea because the picture is deprived of detailed components of video signal.

The idea of "emphasis" is able to reduce noise without such by-product based on the principle that video signals are "emphasized" during recording to compensate for the small signal components to be lost during playback.

This principle is advantageous in that recording and playback work complementary to each other so that only noise can be reduced without cutting off detailed signal components. VHS and S-VHS have conventionally used this emphasis technology as applied to horizontal signal processing, for instance

Technical Guide

as main emphasis and sub emphasis. This method is now applied to vertical processing to provide the "vertical emphasis" noise reduction system. With this, we are one step closer to the ideal of noise reduction, without loss of detailed signal components.

■ Temporal emphasis

Another noise reduction technology developed for W-VHS is this temporal emphasis which also suppresses noise without cutting off detailed signal components. Temporal emphasis has been invented by expanding the concept of emphasis in temporal direction. Emphasis based on the video signal variation from one frame to another is applied to all the picture elements of the whole frame by means of digital signal processing.

Temporal noise reduction which has conventionally been executed during playback tends to produce an unnatural effect in terms of motion. A variety of technical considerations have been made to minimize this by product. This problem is basically resolved by the temporal emphasis by virtue of the complement-ary operation of recording and playback. In view of this, temporal emphasis obviously plays an important role in the technical requirement for making noise reduction in W-VHS compatible with reproduction of details.

■ TCI (Time Compress Integration) recording system

Existing TV signal consists of a luminance signal indicative of brightness and a composite signal carrying color signals in superposition. Luminance signal and color signals must be once separated for different signal processing. They are finally combined together on the tape as frequency-modulated luminance signal and color signals frequency-converted to low range. While of course the frequencies in use are different between these signals, recording a luminance signal and color signal together has caused a number of technical problems such as interference between signals.

In the high vision system, on the other hand, the broadcasting station itself transmits luminance signal and color difference signal separately as different components. The TCI system has been developed to take advantage of this principle of high vision.

In the TCI system, the luminance signal and the color carrying color difference signal are temporally compressed and rearranged and are then recorded on the tape. That is, the luminance signal and color signal are not recorded together, and instead, they are recorded on different sections of the tape, minimizing the signal interference in its own principle.

This system is used not only for HD mode for high vision recoding but also for SD mode for recording the existing TV signal.

■ HD digital TBC (Time Base Corrector)

W-VHS HD mode achieves a high-density recording using the two-track parallel recording system in which a high vision signal is recorded in two parallel tracks.

Such two-track system has been associated with one problem, that is, temporal difference between track widths during playback, or so-called inter-track jitter. The time base corrector corrects this jitter and reinstates the original signal to provide a stable picture quality.

■ SD digital TBC (Time Base Corrector)

In SD mode, video signal is recorded in one track. However, as in conventional VHS and S-VHS, jitter is experienced because of subtle difference in relative head speed between recording and playback. In order to offer excellent recording and playback properties, the SD digital TBC is provided also for SD mode so that digital signal processing prevent temporal variation as a cause of jitter of the picture.

Technical Guide

High Definition Video Design (Basic Signal System)

■ Low-noise discrete REC amp

The video signal REC amp, which is usually made of IC (Integrated Circuit), has been made of carefully selected separate components. This ensures a largely reduced noise, especially improving the S/N ratio in the color signal bandwidth.

■ Hyper parallel FET preamp

Preamplifies the signal picked up from the playback head. While usually one preamp is assigned to one head, SR-W320U uses multiple preamps arranged in parallel for one head. The output signals from the playback head are thus combined together for noise suppression. The number of the preamps is 16 for S-VHS SP/EP modes and 16 for W-VHS HD/SD modes. Besides, each preamp is constituted by FED (Field Effect Transistor) which is easy to shut out noise current. This had led to outstanding noise reduction over a low-frequency range including color signals where noise reduction has so far been difficult.

High Definition Video Design (Signal Processing System)

■ 629 digital TBC

Time base corrector is a circuit adjusting the timing and length of individual scanning lines. Video signals picked out of the tape undergo subtle variation in timing, going fast on one occasion and slow on another, because of irregular tape transport and vibration and irregular rotation of the head drum. This is called jitter which is one of primary causes of picture distortion. The digital TBC stores the video signals of the whole scanning line in memory and reads out at a quartz-accurate timing. This leads to a picture with vertical lines in good order which is not affected by tape running accuracy. Also, the newly developed 629 digital TBC applied correction to the color signals converted to low-range frequency (629 kHz). This suppresses hue variation which has been associated with high frequency jitter, thus ensuring stable color reproduction.

■ 3 dimensional dynamic color processing

Color signal processing is executed in consideration of the preceding picture stored in frame memory. This can handle still pictures, thus improving the reproduced color S/N.

■ 3 dimensional digital Hadamard

It has been difficult to eliminate noise in dark and pale areas delicately alternating. JVC has succeeded in extracting noise component only by means of sophisticated mathematical analysis theory, Hadamard matrix. The 3 dimensional Hadamard has further promoted this principle. In addition to signal processing matching noise frequency and level, the frame memory storing the entire preceding frame in memory is provided to compare it with the current frame. This achieves noise reduction in accurate response to picture variation.

■ 3 dimensional Y/C separation

Home-use VCR separates a luminance signal (Y) and color signal (C) from each other to record on separate frequency ranges. TV signals, on the other hand, consist of luminance signal and color signal combined together, so it is necessary to separate them before recording. This job is performed with the Y/C separation circuit. If this separation fails, there occurs such troubles as cross color and dot disturbances during playback. In SR-W320U, JVC has observed that, although the picture moves continuously, there is slight variation frame by frame. Based this observation, one frame right before the current frame is altogether stored in memory and compared with the current frame. Y/C separation takes place in accordance with the comparison result so that in overall, picture suffers minimum of dot disturbance and cross color, while maintaining high resolution not only horizontally and vertically, but also transversely. If the scenes drastically change frame by frame, or there is sharp motion in a picture, the current frame is obviously unlike the frame previously in memory. In that case, separation is executed with the 3 line digital logical COM Y/C separator which compare one scanning line with another. Besides these, the newly designed motion detecting software which is most important for 3 dimensional Y/C separation, and input/output filters enable you to enjoy picture with reproduction of sharp details, outstanding 3 dimensional impression and superb density and definition. You have a choice between "STD" for normal picture, "MOVE" oriented to reproduction of sharp motion and "High S/N setting" with improved SN effect depending on the nature of your video sources.

■ New AI natural color system

Color smear can be avoided by digital processing of color signals. Also, the newly developed procedure of processing has achieved reproduction of fine tones of darkness and lightness which has so far been difficult to achieve.

Technical Guide

■ Basic S/N improvement in signal system

Discreet detail enhancer

Used to correct the video signal deteriorated due to repeated recording and playback so as to provide a clear cut contour of picture. This enhancement is made of carefully selected separate components, with no use of IC (Integrated Circuit). This has achieved not only detail improvement but also much lower noise.

Double color processing

Color signal processing circuit picks up the color signal converted to low frequency to combine with the luminance signal. The capability required of this circuit is entirely different between normal playback and search. In normal playback, it is essential to steadily try to cope with noise problem. On the other hand, search must handle the variations coming one after another very quickly. In view of this, JVC has provided two separate circuits, double color processing circuits, for these separate purposes. The result are both dense and clear normal playback picture and clean search picture with minimized color disturbance.

High quality HiFi design

■ Logical HiFi NR (reproduction)

Low frequency noise which tended to occur on the HiFi tape recorded on another recorder has been cut off by highly responsive, micro-computer controlled filters. This makes it possible to reproduce commercially available software or rental video.

■ Hyper grounding bus

In order to eliminate potential difference at each ground connector of audio circuits as well as eddy current distortion, three steel plates have been placed at the ground connector to ensure a lower impedance of ground.

■ Audio dedicated power supply + audio's separate circuit board

Since the power supply and circuit board of audio system are separated from those of mechanical parts subject to considerable variation, power supply voltage is stabilized to high quality recording and playback independently of other circuit noises.

■ Hyper tangent method

In VHS HiFi, audio is recorded also with a rotary head, signals are picked up by alternately switching the two heads during playback, resulting in undesired switching noise.

The hyper tangent system forecasts the waveforms from the information obtained from the two heads and fills the gap between them. Besides, the result is examined to correct error if any, so that clearer HiFi audio can be obtained by this facility.

Mechanism

■ HD super solid DD mechanism

The super solid mechanism developed for high performance and high responsiveness has further been improved to provide a tape transport mechanism suitable for the top end video cassette recorder. It ensures low jitter, low noise and stable tape tension mechanism.

■ Dynamic digital search

Generally refers to the high speed, high picture quality search functions enabled by improvement in mechanism and digital video processing.

Hyper strobe search

If you want to quickly check content of the tape, you can use this facility. The one hour program of an SP recorded tape can be checked at 30X speed in less than two minutes and the same program of a SP recorded tape can be checked at 100X speed in 40 seconds.

Skewless fine search

Shuttle search is convenient for briefly fast forwarding or rewinding during playback. Skewless fine search is the picture improved version of the shuttle search.

High speed open search

You can use this search to find your desired section during fast forward or rewind. Tape advances at 30X speed for SP mode and 100X speed for EP mode.

NF super rewind

When entering the next function such as rewind, turn the power off and unloading the tape, the length to be rewound is checked. For a longer section to be rewound, the tape is reloaded to be rewound at a super high speed. 120 min. tape can be rewound in one minute.

High functions

■ Video status

Video status can be easily called up depending on video sources. In addition to AI auto, dubbing and rental, there are 2 user memories provided to allow users to select their desired setting.

■ AI auto calibration

Recording level is selected in dependence on the characteristics of each tape for use in recording to make best use of those characteristics.

Index

A

AI auto calibration 20
AI AUTO 11,30
Auto tracking 10
AUDIO OUT SELECT 14

B

Blank search 10,19
BLUE BACK 9

C

Cleaning tape 6
COUNTER RESET 10

D

DISPLAY button 11
Dubbing (copy) 32,33,34

E

EDIT button 11

H

HD mode 4
HiFi AUD OUT SELECT 11,14,24
HiFi recording level adjustment 19
High speed open search 25
Hyper strobe search 26

I

INDEX BUTTON 11
IN/OUT SELECT button 9
INPUT SELECT button 10

M

Master edit control 34

N

Next function memory 14
NF super rewind 29

P

PICTURE adjust knob 9,31

R

REMOTE PAUSE connector 9,12
Retake function 19
RS-232C 35

S

Safety tab 5
SD mode 4
Skewless fine search 26
Slow tracking control 31
S1 Picture Signal 8
S-VHS REC switch 9

T

Timer programed Recording 21

V

VARIABLE SEARCH button 10

12 SPECIFICATIONS

• Power supply	AC 120 V, 60 Hz
• Power consumption	78 W (10 W with power off)
• External dimensions	445 (W) ×182 (H) ×463 (D)
• Weight	16.2 kg
• Allowable operating temperatures	+5°C — +40°C
• Allowable relative humidity	35% — 80%
• Allowable storage temperature	–20°C — +60°C

Video

• Recording/playback format	[W-VHS format] HD mode: Rotary 4-head helical scanning system SD mode: Rotary 2-head helical scanning system Temporal compression TCI signal FM recording [S-VHS/VHS format] Rotary 2-head helical scanning system Luminance signal FM recording Color signal Phase shift, converted sub-carrier direct recording
• Video signal	NTSC -type color signal Hi-vision baseband signal

HiFi Audio

• Recording system	VHS stereo HiFi system
• Frequency response	20 Hz — 20 kHz
• Dynamic range	90 dB or more
• Wow & flutter	0.005 % or less
• Channel separation	60 dB or more

Normal Audio

• Recording system	Linear track
• Audio track	1-channel monaural

Timer (Timer programming/clock)

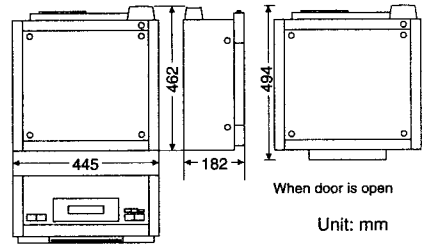
• Timer programming	2 weeks 8 programs
• Clock	24-hour system
• Breakdown backup time	Approx. 30 min.

Connectors

• HD Video	Input Y: 0.7 Vp-p, 75 ohms, ternary in sync PB, PR: ±0.35 V, 75 ohms, ternary in sync Output Y: 0.7 Vp-p, 75 ohms, ternary in sync PB, PR: ±0.35 V, 75 ohms, ternary in sync
• S Video	Input Y: 0.8 - 1.2 Vp-p, 75 ohms C : 0.2 - 0.4 Vp-p, 75 ohms Output Y: 1.0 Vp-p, 75 ohms C : 0.29 Vp-p, 75 ohms
• Video	Input 0.5 – 2.0 Vp-p, 75 ohms (BNC) Output 1.0 Vp-p, 75 ohms (BNC)
• Audio	Input –8 dBs, 50 kohms (RCA) Monaural on front panel connectors only (left) Output –8 dBs, 1 kohm (RCA)
• REMOTE PAUSE	For editing with JVC Video movie deck
• Remote control unit	RS-232C

Accesories

• Provided accesories	Cleaning Tape Power Cord



When door is open

Unit: mm

* Designs and specifications subject to change without notice.